
COMPLETE
MINERAL
CATALOGUE.
FOOTE


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GEMSTONES·OF·NORTH·AMERICA·PROSPECTING·FOR·GEM
STONES·AND MINERALS
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Nov 1954

A COMPLETE CATALOGUE OF MINERALS

Compiled by WARREN M. FOOTE

Containing Useful Lists and Tables of Reference, with Specimen Prices of All Common and Many Rare Minerals. For the Use of Teachers, Students, Collectors and others Interested in Mineralogy and its Practical Applications

186 Pages, Illustrated by 40 Photo-Engravings

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INTRODUCTION.

The COMPLETE MINERAL CATALOGUE has been compiled with the double purpose of advertising our business, and of gathering together valuable information for our own and others' use. It is larger than former catalogues, and we believe better arranged. The first part is taken up with a descriptive price-list of cabinet specimens and collections; the second with lists and tables of reference. With the rearrangement of the various collection lists to keep pace with new discoveries in mineralogy, it is hoped that the requirements of class and self-instruction are met to even a greater extent than before. Care has been exercised to give a just and accurate description of the various specimens offered for sale.

The engravings are another new feature, having been prepared expressly for this volume under our direct supervision, in the hope that artistic and scientifically exact illustrations might be obtained.

The idea of publishing a short table based on Dana's classification originated in 1876, and our catalogue, which appeared in that year, contained the first "Table of Species." The large sale which this first edition and succeeding reprints met with; the approval everywhere won for it among scientists and educators, has led to the preparation of an entirely new table according to the last edition of Dana. As now presented, it states concisely the composition and form of each species, with a proper classification of its varieties. As before, an index and also a supplement are added. We have found a constant need in our work, of a classification of minerals according to their metallic constituents, showing at a glance what minerals contain given metals. Its usefulness was so manifest, that the lack of any complete list of the kind, led to the compilation of the one now published for the first time.

Errors have doubtless crept in despite every care, including the reading of four proofs. As the increased usefulness of future editions is earnestly desired, any corrections or suggestions will be greatly appreciated.

A WORD AS TO OUR BUSINESS. We supply institutions, teachers, students and professional men, with type specimens for study and reference. In the filling of these orders we draw from an enormous stock of minerals, which has been steadily increasing in volume and scope since the nucleus—Dr. Foote's private cabinet—was exhibited at St. Louis in 1875. The expansion of this great collection has been along lines indicated by the demand for good teaching material. The other important department secures through correspondence and personal collecting, newly-discovered species, or unique and choice examples of the familiar minerals, which are in demand among museums and private collectors. The separate department dealing in old and new scientific and medical books, is continued.

To Purchasers.

PRICES throughout this catalogue will be strictly adhered to. We can, however, quote on cheaper material, the price being lowered at the expense of quality. Terms are net cash. Our plan of marking specimens with lowest price has given general satisfaction, and will be continued.

PAYMENT should accompany orders from those unknown to us, unless business references are given, or the shipment is made to an institution. Money will be cheerfully refunded on any item returned in good condition within ten days of date of delivery.

APPROVAL. Specimens will be sent for examination to institutions or others known to us or furnishing references. The cost of returning rejected specimens and risk of loss or breakage, must be borne by purchaser. Collections will be sent only on positive order.

PACKING and boxing is done at our expense and in the best possible manner by experienced assistants. Every precaution is taken to insure safe transit, but our responsibility ends with delivery to the common carrier. Shipments are made to all parts of the world by freight, express or post, cost of carriage to be borne by purchaser.

VISITORS TO PHILADELPHIA will find our store, at 1317 Arch Street, most convenient. It is located in the centre of the city, and is but three minutes' walk from Broad Street Station (Pennsylvania Railroad).

Minerals Bought and Exchanged.

We buy in quantity, paying in cash or specimens, any minerals not already well represented in our stock. Either valuable cabinet specimens or the less expensive ones for educational collections. The latter must be good illustrative types and first-class in every respect.

Small mail samples must accompany all offers.

I.

NEW MINERALS.

Brief Mention of Recent Discoveries and Other Interesting Minerals Offered for Sale in Fine Cabinet Specimens.

To curators of museums, teachers, students, private collectors and others interested, this descriptive list is issued.

Our facilities for securing rare and often valuable specimens continue to be unequalled. The numerous long collecting trips personally made to many countries, and a wide correspondence, have established lasting connections with collectors at many of the principal localities of the world. Frequently, arrangements are made to receive all the best specimens of certain finds. These direct consignments, constantly coming in, afford a rare opportunity to students and lovers of minerals to pick from fresh material. Where selection is left to us, the tastes and desires of the purchaser are followed as closely as possible. Instruction as to preferred size, price, etc., will materially assist in filling orders.

Prices are for good cabinet specimens, and in many cases have been much reduced. Small pieces for amateurs and beginners can be had at prices lower than the lowest quoted, while the highest price does not always refer to the best of the kind on hand.

A complete list of the minerals we have for sale may be found in the *Alphabetical Index and Price List. Announcements of new and important accessions to stock are published from time to time, and will be mailed free to any address.*

New England.

Chrysoberyl, Greenwood, Me. The accompanying engraving fails to do justice to the perfection and symmetrical outline of these neat crystals. They are orthorhombic twins (pseudo-hexagonal), green in color, of thin, tabular habit, and show radial, feather-like striations. (See Dana, p. 229, Fig. 5.) No such Chrysoberyls as these have been known in America or Europe for years, and similar ones, when found, brought high prices. Crystals in white feldspar matrix. 50c. to $2.50



Herderite, Auburn, Me. The small specimens found in Saxony, prior to 1825, by which this exceedingly rare mineral was long known, are entirely eclipsed by the few splendid crystals recently found at this locality. Several of good size,

pale brown-yellow and transparent, show bright planes and sharp angles, with perfect terminations. $3.00 to $7.00

Beryllonite, Stoneham, Me. Another rare beryllium phosphate. Semi-transparent crystals. 50c. to $1.25

Bertrandite, Auburn, Me. Small crystals, associated with clear, bluish Apatites. $1.00 to $3.00

Pollucite. Small pieces. 25c. to 75c.

Diaspore, Chester, Mass. A find of this rather rare mineral, at the Chester Emery Mines, is a revelation to collectors, who have hitherto known only massive pieces or an occasional crystal. The new crystals are transparent, with beautiful violet and amethystine tints; clear-cut and brilliant as gems, the terminal planes especially lustrous. They are long, tabular in habit, and occur grouped on Emery. The few first found were sold immediately at a high figure. Since then we received practically all the best crystallizations saved in blasting. None have been found for over a year, and the mine dumps were thoroughly searched. Our stock includes some fine groups of 2 to 4 in. diameter. $2.50 to $10.00

Margarite, Chester, Mass. Selected and very pretty pink specimens of this micaceous mineral, showing the crystallization. 35c. to $2.50

Epidote, Gray, Huntington, Mass. A new color for this familiar green mineral. Sharp, bright and well-formed crystals in matrix. 50c. to $3.00

Tourmaline, Haddam, Conn. We have just received a select lot of these wonderful gem crystals. Often the slender prism is a clear green, shading off toward one extremity into a delicate pink. Their exquisite coloring and clearness give them a very dainty appearance. 25c. to $10.00

New York.

Quartz, Herkimer Co. Few minerals are better known and give more universal satisfaction than these cheap crystals. Hard, absolutely clear and flawless, with the brilliant faceting of a precious stone, they deserve the popular name, "Little Falls Diamonds."



Our stock has recently been enriched by the purchase of a large collection made at the locality many years ago. Among the better crystals are some containing bits of Anthracite, as shown in the illustration. Occasionally these black particles rise and fall in the liquid cavities. Crystals, showing moving bubbles, $1.00 to $5.00

Prices for selected crystals, either grouped or single, ½ to 1½ in. diameter, 25c. to $5.00. Smaller at 10c. per dozen, up to 15c. each.

Chondrodite, Tilly Foster Mines, Brewsters. This mine has been permanently closed, and the splendid crystallizations formerly found, are no longer obtainable. We are fortunate in having lately secured a number of excellent specimens from a gentleman who has probably collected more really fine specimens than any other visitor at this famous locality. Groups of bright, gem-like crystals of rich red color are few but fine, at $1.00 to $3.50 each.

Clinochlore, Tilly Foster. Sharp edged, hexagonal crystals, sometimes grouped with Chondrodite. $1.00 to $2.00

Serpentine, crystallized, Tilly Foster. Masses of distinct cubic crystallizations, generally considered pseudomorphous. 50c. to $1.50

Magnetite, Port Henry. A variety of interesting modifications, illustrating various forms between the octahedron and its half form, the tetrahedron. Complete and well-formed crystals. 10c. to 50c.

Fluorite, Muscolonge Lake. Rough crystals, from 3 to 6 in. square, of translucent, sea-green color. 50c. to $4.00

Octahedral cleavages, 1 to 2 in. 15c. to 75c.

Wollastonite, Diana, Lewis Co. Large crystals in Calcite. 50c. to $4.00

New Jersey.

Franklin Furnace, the Mecca of American mineralogists, has, during the last twenty years, been as closely watched as the older regions of Cornwall and the Tyrol. Very little has been found in later years, and the old-time specimens were absorbed by the larger collections. Outside of these, the best specimens were to be found in an old collection, made at the locality. We purchased it, and are able to offer the following:

Franklinite. Octahedral crystals, often modified by dodecahedral planes, ½ to 2 in. in Calcite matrix. $1.00 to $7.50

Rhodonite var. Fowlerite. Well-defined crystals in Calcite. Some of the smaller ones are bright, of rich color. 50c. to $10.00

Gahnite var. Dysluite. Groups of perfect octahedral crystals. $1.50 to $6.00

Axinite, yellow. Prettily mixed with the pink Rhodonite. Distinct crystals. 50c. to $5.00

Chalcophanite, crystallized (drusy). Botryoidal surfaces. Finest found. 50c. to $3.00

Caswellite. Foliated crystalline masses. 25c. to $1.50

Calamine. Splendid masses of white crystals. 50c. to $4.00

Jeffersonite. Groups of large dull crystals. 75c. to $5.00

Willemite, transparent crystals in Bementite. $2.00 to $10.00

Willemite, var. Troostite. Regular crystals, 2 to 3 in. long. $1.00 to $7.50

Zincite. Massive foliated, deep red. 25c. to $1.50

Niccolite, with Fluorite. 50c. to $5.00

Thaumasite, Paterson. A mineral having a most remarkable chemical composition (silicate, carbonate and sulphate of calcium). Heretofore quite rare, but lately found in abundance at this locality. Specimens showing distinct crystals, 50c. to $2.00. Pure compact, crystalline masses, 15c. to 75c.

Apophyllite, Heulandite, Natrolite and other Paterson minerals in good specimens. 15c. to $2.00

Pectolite, Guttenberg. Slender white crystals, often terminated, associated with rich green Prehnite. 25c. to $1.00

Brown Tourmaline, Hamburg. Good-sized crystals of light and dark shades. Their bright planes contrast well with the white Calcite. 50c. to $4.00

Pennsylvania.

Several old collections were recently purchased, among them one made at the Wheatley mines, near Phœnixville, in the early sixties. It yielded—

Pyromorphite. Unusually fine green crystallizations. 50c. to $6.00

Anglesite. Lustrous and perfect crystals on dark Galena matrix. $1.00 to $4.00

Cerussite. Slender white crystals in cavities. 50c. to $2.00

Pyrite, French Creek. Curiously modified and distorted cubes, in a variety of forms, two of which are here shown. This is one of the prettiest and most interesting examples of this common species. 10c. to 50c.



Chalcopyrite, French Creek. Hollowed brass-yellow tetrahedrons, grouped with bright Pyrite on Magnetite. 25c. to $3.00

Rutile, Chester Co. Fine red crystals of 1 to 2 in. diameter, showing the geniculation, or complex twinning, in oddly arranged striations. 50c. to $6.00

Lanthanite, Saucon Valley. Exceedingly rare, minute crystals. $1.00 to $3.00

Quartz, var. Amethyst, Delaware Co. Excellent crystals, doubly terminated; the ends of deeper color than the centres, giving a pretty effect. 50c. to $3.00

Millerite, Gap Mine. Velvety plates of compactly arranged acicular crystals. 25c. to $2.00

Williamsite, Lancaster Co. Beautiful translucent green masses 2 to 4 in. diameter. Polished, 75c. to $2.00. Rough, 25c. to 75c.

Roscite, Chester Co. A crystallized hydromica of recent discovery. Selected specimens. 50c. to $1.50

Missouri.

We have been receiving shipments from the zinc region in the southwestern part of the State for several years, and have made numerous trips to the mines. The following selections from a large stock are offered at low prices:

Calcite, Joplin. Superb honey-yellow scalenohedrons of the transparent quality which yields the doubly-refracting spar. With a high natural polish, sharp-angled and perfect in outline, they are the finest yellow Calcites known. 3 to 8 in. diameter. Price varies with size, 25c. to $12.50



Equally brilliant and perfect smaller crystals in groups. Some are naturally coated with asphaltum, as shown in the illustration. (One crystal has been cleaned.) 25c. to $2.00

A rare form at this locality is a pale purplish scalenohedron, terminated by a lower scalenohedron. Perfect quality. $1.50 to $4.00

"Giant Phantoms." Single scalenohedral crystal, showing an interior of delicate amethystine color, with spear-shaped Marcasite crystals, regularly arranged in dazzling bands, giving a shadow or phantom effect in the interior. 12 to 18 in. diameter, $10.00 to $15.00. The same, 2 to 6 in., 25c. to $2.00.

Calcite var. Iceland Spar. Rhombic cleavages, broken from the centres of the "phantoms." The bright bands of included Marcasite give a further beauty to their yellow and amethystine color. It is a lovely and novel variation in this familiar mineral, which pleases every collector. 1 to 4 in. 5c. to $1.50

Galena. Bright cubes and cubo-octahedrons, 1 to 3 in. Regular and sharp-angled. Some on pearl spar, dotted with exquisite little ruby blendes. Very showy. 25c. to $2.00

Asphaltum-coated Galena. A curious occurrence of bitumen or asphalt, on large octahedrons of Galena; the latter are mounted on Sphalerite crystals measuring 3 to 5 in. across. Another form is an elongated cubo-octahedron, 2 to 3 in. long. 25c. to $3.00

Sphalerite. Our stock embraces many choice examples—either the darker shades known as "black jack" or the rich "ruby blende" in most attractive groups. 15c. to $2.00

Chalcopyrite on Pearl Spar. Wonderfully showy and cheap. It is a good representation of both species, the iridescent tetrahedrons scattered over the pearl-colored Dolomite making a pretty combination. The Chalcopyrites are small, but as delicate and perfect as models. Pieces 2 to 6 in. across. 15c. to $1.00

Leadhillite. Found some years ago in the now abandoned Beercellar Mine, near Granby. The crystals are white to pale green, pseudo-hexagonal and perfectly formed, $\frac{1}{8}$ to $\frac{3}{8}$ in. diameter, on matrix. 50c. to $5.00

Leadhillite Pseudomorph after Galena. Described by W. M. Foote, *Am. Jour. of Sc.*, Aug., 1895. The Galena cubes, found in a chert rock, are changed to a gray amorphous Leadhillite, in crusts and hollow forms. The interior is sometimes lined with drusy crystals of Leadhillite, unaltered Galena occasionally being present.

Gangue specimens and detached cubes. 25c. to $3.00

Arkansas.

Since the first collecting trips made in 1874–75 to this region, and the large sales of Quartz, Brookite and Rutile which followed, our stock has been constantly replenished by the specimens secured in work done expressly for us at the localities. The purchase of the famous Lawrence collection and other smaller ones gave some remarkable specimens.

Quartz var. Rock Crystal, Hot Springs. Undoubtedly we secured the largest stock of these splendid crystallizations in the world. Of the regulation type, that shown in Plate IX is a good example. Prices for single crystals and groups 2 to 6 in. across, 10c. to $5.00. Several magnificent museum groups, 10 to 15 in., $10.00 to $25.00. One specimen about 2 ft. square, $50.00.

Flat crystals and other distorted shapes, illustrated in Plate I. 25c. to $7.50

Twin crystals. $1.00 to $5.00

Chloritic Quartz. We have a nice assortment of these green "phantoms," owing their odd appearance to the regular inclusion of a moss-like chloritic mineral. Also similar inclusions of Albite crystals.
50c. to $4.00

Monticellite, Magnet Cove. Distinct crystals of about ½ to 1 inch diameter, in Calcite matrix. 25c. to $3.00

Dysanalyte. Bright and perfect crystals in matrix, 50c. to $2.00. Detached cubes, cubo-octahedrons and octahedrons. 5c. to 35c.

Wavellite. Handsome specimens, showing green radiations on a flat matrix. 10c. to $2.00

Vesuvianite. Symmetrical but rough crystals of 2 to 4 inches diameter. Excellent for illustration in crystallography. $2.00 to $5.00

Rutile. The accompanying figure pictures the geniculated form of twinning, which these specimens illustrate so well. We have complete sixlings and eightlings in stock to-day which are better than any previously found.
Prices, 25c. to $1.00



Brookite. In single detached crystals of perfect orthorhombic form and brilliant planes. Also pieces of white feldspar with the clear-cut, black crystals in fine contrast.
25c. to $2.00

Rutile Paramorph after Brookite. Excellent representatives of this curious alteration.
10c. to $1.00

Manganpectolite. A new Zeolite, containing 4.25 per cent. of manganese oxide. Cleavages. 50c. to $1.50

Pseudoleucite. An altered Leucite. Large, rough crystals in matrix.
25c. to $1.50

Magnetite var. Lodestone. Masses possessing strong polarity, picking up tacks, needles, keys, and extra large nails. 10c. to $2.00

Colorado.

Microcline var. Amazon-stone. Probably no discovery has ever interested collectors more than the finding of this superb Feldspar at Pike's Peak, in 1875. The unusual size and perfect outline of the crystals, combined with the fine green color, rendered them far superior to the specimens previously found in Russia and sold at exorbitant prices. Numerous trips were made to the locality and much costly work done. Of the specimens secured, most of the best were long ago scattered among the museums and collectors throughout the world. We still have several very fine groups and single crystals, of 4 to 12 inches diameter, at $5.00 to $35.00, including a Baveno twin. Smaller at 10c. to $4.00



Manebach Twins, from Florrisant.
$1.00 to $3.00

Smoky Quartz, Pike's Peak. Crystals 2 to 6 inches long. 10c. to $1.50

Garnet, Salida. These dodecahedral Almandites are invaluable for crystallographic illustration on account of their size and the remarkable symmetry and perfection of form. We secured a large lot by working the mine in which they were found. Although we have sold quantities, we can still offer complete and unbruised crystals, 1½ to 4 inches diameter, at 25c. to $4.00 each.



Broken crystals, showing the outline well. 10c. to $2.00

Astrophyllite. A titaniferous mica, from El Paso Co. Long bladed crystals, of bronze color, in matrix. 15c. to $1.50

Calaverite. Specimens from the famous Cripple Creek Mines, some showing crystallization. $1.00 to $4.00

Calcite Pseudomorph after Hanksite. An interesting alteration, in flat hexagonal crystals, 1 to 1½ in. 25c. to $1.00

Phenacite. In crystals, ⅛ to ⅜ in. diameter, both detached and on matrix. 10c. to $3.00

Zircon, St. Peter's Dome. Gemmy little crystals, showing interesting modified habits. In gangue. 25c. to $1.00

Bastnasite and Tysonite. Two rare cerium minerals, the former crystallized. 50c. to $4.00

Orthoclase. In groups of fine crystals, 2 to 6 in. 10c. to $2.00

New Mexico.

Endlichite, Hillsboro, near Lake Valley.—"The finest American mineral?" Probably two lead compounds, Wulfenite and Vanadinite, occupy a position near first place, in most answers to this common query. Clear Anglesites and Cerussites, and the rare but gorgeously colored Tasmanian Crocoites, are other examples of the lustrous crystallizations in which the salts of lead are found. And now from the same family comes another candidate for honors, everything but size being claimed for it. A dazzling lustre, well called adamantine; clear transparent quality; exquisite regularity and definiteness of outline; color shading through yellow, red and brown, and occurring in an amazing number of types. The species was first found at Lake Valley in 1886, in crystals which did not compare with the present ones, and attracted little attention. It contains about equal portions of vanadate and arsenate of lead, with chloride of lead; occurs in the brownish-yellow rounded forms and the pale yellow hexagonal prisms common to Mimetite, and again red and in hollowed crystals like Vanadinite, also occupying a position between these two in composition, the first an arsenate, the second a vanadate of lead. Two years ago a few specimens of small crystals were sent us from Hillsboro and quickly sold. In some recent prospecting done on the same property, crystals of unusual size and quality were found, resulting in our contract with the owners to buy the specimen output. Work was commenced and some wonderful crystallizations secured. They were found sparingly in seams of a siliceous sandstone, some on crystallized Calcite; often lying loosely in a puffy clay formed from the decomposition of the original matrix, leaving the crystals detached and imperfect. The "pay ore" was massive, yielding no crystalline mineral.

In Plate II are shown some of the types in which this most unique mineral occurred.

1. Transparent prisms of dazzling lustre and golden yellow color, $\frac{1}{8}$ to $\frac{1}{2}$ in. long, terminated by basal plane of equal brilliancy. Rarely attached to the solid rock.

2. Opaque straw-yellow perfect prisms, terminated by basal plane or pyramid, or both. In several specimens a surface of two or three square inches was covered with such crystals, averaging $\frac{3}{8}$ in. long. Generally detached, with one termination. (See central group and some single crystals in plate.)

3. Small but marvellously brilliant yellow crystals are doubly terminated, scattered thickly over flat limestone surfaces. Again this matrix is a dark-brown Jasper, as in the upper specimen illustrated.

4. Flat tabular prisms often doubly terminated, in solid masses. Varying shades of yellow, sometimes charmingly mottled with red.

5. The above in "fringed" crystals—*i. e.*, the prismatic planes appear to extend beyond the basal plane in a hexagon of delicate capillary crystals, all standing parallel to the larger prism, leaving its basal plane as the floor of a miniature inclosure.

6. Masses of interwoven acicular crystals, red to yellow, terminated by pyramid and basal plane.

7. Red crystals, $\frac{3}{8}$ to $\frac{5}{8}$ in. long, terminated by pyramid and small basal plane, some in "skeleton" forms. Always detached.

8. Smaller slender prisms, dark reddish brown; of quite different aspect from the others, yet possessing the same perfection and brilliancy.

9. Specimen in lower left-hand corner of plate. Rather dark but translucent prisms of about $\frac{1}{8}$ in.: if anything, even more lustrous than the others. *The middle of the crystal yellow, the ends a decided red.* The latter consist of brilliant basal plane and dull pyramid. These are the gemmiest and at once the oddest and most beautiful small crystals of any known mineral.

To see actual specimens is to understand the impossibility of picturing them justly. Many collectors have already purchased a full series, and dealers have made large purchases from our stock. These specimens will soon be widely scattered and no longer obtainable, though our present prices indicate neither its great rarity nor our exclusive control of its sale.

Specimens of the finest quality of the various habits above described, $1\frac{1}{2}$ to 5 in. diameter. $2.00 to $9.00

Smaller groups, many of them making what are considered the finest microscopic mounts known,; also single crystals. 25c. to $1.50

Descloizite, Socorro Co. In drusy masses of bright and distinct crystals. 50c. to $3.00

Turquois, Las Cruces. Choice gem material of the highly-prized sky-blue shade; veins and masses in Quartzyte. 25c. to $2.00. Paler shades, 10c. to 75c.

Smithsonite, Kelly. Rivaling the Grecian product in beauty of color and satiny lustre. Green tinted, botryoidal masses. 50c. to $2.00

Meteoric Iron, Sacramento Mts. See IV, Meteorites.

Wulfenite, yellow, Organ Mts. Good-sized groups of tabular crystals, $\frac{1}{2}$ to 1 in. across. Varying in color from brown to yellow. 25c. to $2.50

Garnet var. Grossularite, Jarilla Mts. Curiously striated, detached crystals. Perfect, $\frac{1}{2}$ to $\frac{3}{4}$ in. 10c. to 25c.

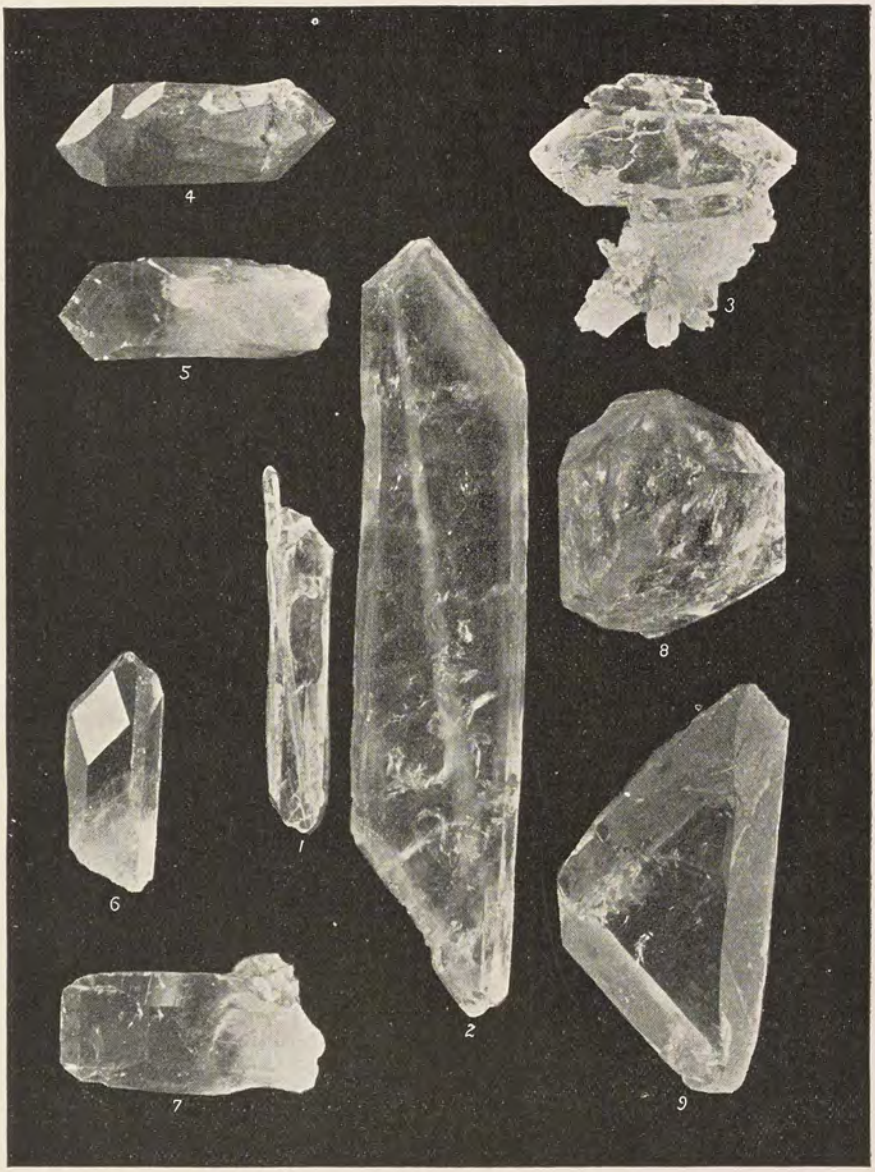


PLATE I.

Curious Modifications of Quartz var. Rock Crystal from near Hot Springs, Arkansas.

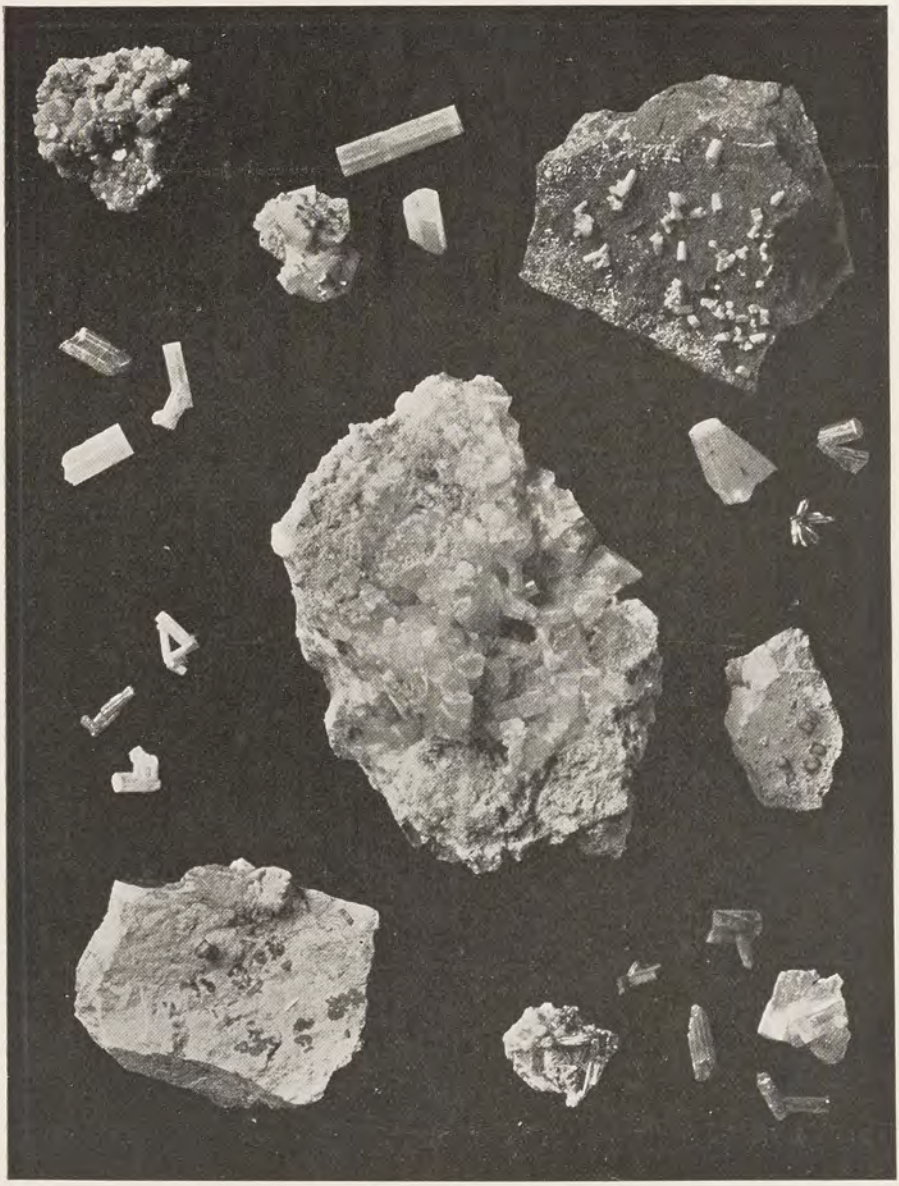


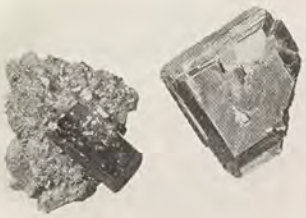
PLATE II.

Various forms of Endlichite, an Arsenate and Vanadate of Lead found at Hillsboro, near Lake Valley, Sierra County, New Mexico.

Limonite Pseudomorph after Pyrite, Jarilla Mts. Groups and single crystals. Bright and sharp octahedrons, modified by the pyritohedron. 15c. to $1.00

Arizona.

Wulfenite, Red Cloud Mine. One of the most beautiful crystallizations in nature. Our illustration gives but the outline, with no hint of its high lustre and gorgeous orange-red color. We were the first to collect this mineral in any quantity, and obtained, by several visits to the mine, a stock of specimens that has since supplied more than one dealer. We still have a superb museum specimen at $50.00, which shows crystals 1 in. across.



Crystals ½ to 1 in., some on matrix. 25c. to $5.00

Azurite, Copper Queen Mine. This locality is now known the world over by its splendid crystallizations. Our stock is large and prices low. Simple crystals possessing the brilliancy and rich color of Sapphires are scattered in pretty contrast over a light matrix. Also wheat-sheaf forms; stalactitic and drusy; agate-like structure; balls of "Chessylite," ¾ to 2 in. diameter (Morenci). 15c. to $2.50

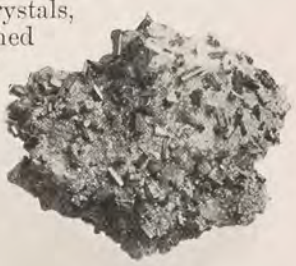
Malachite, Copper Queen. Exquisitely delicate tufts of slender crystals in cavities. Velvet surfaces. A few banded with Azurite, polished. 15c. to $1.50

Cuprite, cubes and octahedrons, Copper Queen. Good crystals are fast becoming rare. Extra fine groups. $1.00 to $5.00

Cuprite var. Chalcotrichite. Another charming mineral from the Copper Queen. Cavities of the rock are filled with matted tufts of capillary crystals of rich red color and sparkling appearance. Finer than the old Cornish specimens and sold at half the price. 25c. to $3.00

Diamondiferous Meteoric Iron, Canon Diablo. See IV, Meteorites.

Vanadinite, red. Yuma Co. A mineral famed for its beauty. None has been found in later years, and it is becoming rare. Specimens like the one illustrated, with doubly terminated crystals, clear-cut as gems and of rich color; also detached skeleton crystals. 25c. to $9.00



Vanadinite, brown. Yavapai Co. Doubly terminated, barrel-shaped crystals on matrix. 25c. to $5.00

Dumortierite. Blue masses. 25c. to $2.00

Jasperized Wood. Chalcedony Park or Great Petrified Forest. This splendid petrifaction, with its shades of red and violet charmingly blended, is too well known for description. A special collecting trip to the

Forest brought us choice examples of trunks 20 in. diameter down to small sections of limbs.

Polished sections, showing the bark nicely. $2.00 to $25.00
Selected pieces, unpolished. 10c. to $1.00

Calcite var. Stalactite, Copper Queen. We have an excellent stock of these attractive specimens. The delicate sea-green tint is due to the presence of copper; 3 to 9 in. long, prettily frosted, in coralloidal forms. 15c. to $2.00

One large show specimen, 24 in. long, 8 in. thick at base, and gracefully tapering to point. Especially beautiful shape, pale, translucent green. $15.00

Another of the "curtain" type, 33x14 in., pure white, with delicate veinings of green. $20.00

California.

Lawsonite, Tiburon Peninsula. *Bull. Dept. Geol. Univ. Cal.*, May, 1895. Occurring in well-defined orthorhombic crystals, up to 1 in. and more in length, of varying habit. Long, squarish prisms; tabular crystals; twins, with feather-like striations; in cavities, small crystals of octahedral symmetry. See illustration; also figures in original description. It is brittle and highly cleavable; hardness, 8; color, gray (resembling some Corundum); composition, $H_4Ca\ Al_2Si_2O_{10}$, basic metasilicate of calcium and aluminium. In chemical character it presents an interesting analogy to Carpholite ($H_4Mn\ Al_2Si_2O_{10}$), though it is a distinct and well-established species, both chemically and crystallographically.



We purchased all of the good crystallizations found, working over a quantity of the Margarite schist, in which it occurs, to obtain the few fine specimens offered for sale. The best, 1½ to 4 in. $2.50 to $10.00

Less perfect but typical matrix specimens and single crystals. 25c. to $1.50

Borax Lake Region. Several trips were personally made to this now famous locality, and connections were established which afforded us regularly for several years the best specimens found. These shipments continued until the final closing and abandoning of the mines. The various species are well represented in our stock, and, despite increasing rarity, are offered at low prices.

Hanksite. Crystals ½ in. diameter, such as we retail at 25c. each, were sold in England, in 1887, for £1. A lot which was the result of several years saving includes several types: (1) Flat, tabular crystals, with pyramid and prominent basal plane; (2) with pyramid highly developed; (3) long prism and pyramid. Perfect and complete crystals, translucent, and as regular as models, ⅜ to 1 in. 10c. to 75c.

A few large groups of tabular crystals. $2.00 to $7.00

Thenardite. Fine orthorhombic crystals, 2 to 6 in. long. Single and grouped. Their large size makes them useful for crystallographic demonstration. 25c. to $4.00

Small twins (crosses) and simple crystals, 1 to 1½ in. 10c. to 25c.



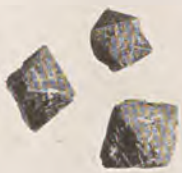
Halite, Rock Salt. See Plate III. Numerous distorted and abnormal forms of the cubo-octahedron are represented. The beauty and oddity of these transparent, sharp-angled crystals found for them a large sale. We still have selected specimens, 1 to 2 in. long at 15c. to 50c.

It can be preserved with no more than ordinary precautions, being unusually impervious to dampness.

Halite, cubical. In groups of pink and pale yellow cubes, often hopper-shaped. They make cheap and showy case specimens. 2 to 8 in. diameter. 25c. to $4.00

Halite, banded. An odd and pretty variety, composed of alternate layers of a pink, green, red and gray salt. 2 to 6 in. 15c. to 75c.

Northupite. W. M. Foote, *Am. Jour. Sc.*, Dec., 1895; J. H. Pratt, *Am. Jour. Sc.*, Aug., 1896. Carbonate of magnesium and sodium with sodium chloride, $MgCO_3.Na_2CO_3.NaCl$. (Pratt). The comparatively small find of this new species was purchased by us entire in 1895. The crystals vary in size from two millimeters to rarely a centimeter in diameter, and are regular and perfect. The octahedron is the only form observed. The triangular markings characteristic of diamond crystallization are not uncommon on Northupite crystals, together with a habit of parallel grouping. On breaking open a crystal or holding a small, translucent one to the light, there are plainly seen regularly arranged dark lines, due to inclusion of carbonaceous matter.



Complete crystals. 25c. to $3.00

Broken crystals. 10c. to $1.00

Pirssonite. J. H. Pratt, *Am. Jour. Sc.*, Aug., 1896. Hydrous carbonate of calcium and sodium, $CaCO_3.Na_2Co_3.2H_2O$. Another exceedingly rare new species. Found only in small, loose orthorhombic crystals of a few millimeters diameter, generally complete, and in several distinct habits.

We have the only crystals offered for sale, but a few grammes having been found. 75c. to $4.00

Native Antimony, crystallized. Near South Riverside. A few excellent specimens from a recently located mine. Glistening crystals of the pure metal, ¼ to ½ in. thick, are massed together with a yellow antimony oxide; where the latter is weathered away the rhombohedral symmetry is shown. 50c. to $2.00

Metacinnabarite, Lake County. Black masses in barite. 25c. to 75c.

Colemanite, San Bernardino Co. We have the only large stock of this mineral in the world. In the lower part of Plate VI are shown a group and a detached crystal, the latter one of many habits assumed. It possesses a remarkable adamantine lustre, so bright as to prevent a good photographic reproduction of the crystal outline. It is a perfectly stable compound and a most beautiful example of the class of borates. Showy groups, 50c. to $7.00. Single crystals, 15c. to $1.00.

Tourmaline var. Rubellite, Pala, San Diego Co. Discovered in 1892. We were the first to offer it for sale, and now have over two tons of selected specimens. It is one of the handsomest minerals known, the delicate pink crystals radiating through a lilac Lepidolite rock, presenting a most charming combination of colors. As a showy cabinet specimen, or for ornaments, paper-weights, etc., it has few rivals. The quantity found places the price below any mineral of equal beauty. Museum specimens, 8 to 20 in., with large radiations of crystals, $2.00 to $10.00. Choice smaller pieces, with fine radiations, 2 to 6 in., 15c. to $1.50.



Other American Localities.

"Opalized Wood" (*Opal var. Wood-opal*), Clover Creek, Lincoln Co., Idaho. Since the discovery of this wood two years ago, it has been sold largely as "the most perfect and beautiful petrifaction in existence," and the statement has never been seriously questioned. The single tree discovered was uncovered by blasting away the volcanic ash in which it was buried, thereby shattering and utterly ruining the greater part of it. The few solid branches saved were purchased by us. It appears to have been a finely-marked oak or similar species, the small cells, tissue, rings, radial lines, knots, bark and other signs of tree growth being shown with a perfection and minuteness of detail which is simply marvelous. All this is reproduced in a lustrous brown-yellow semi-opal, the various shades being occasionally contrasted with a rich and very dark opal at the centre. The panel inlaid on the cover of the *Complete Mineral Catalogue* gives but a poor idea of its appearance. The section illustrated in Plate IV is an average specimen. Prices are as low as have been asked for any of the inferior petrifactions. Large show specimens, polished cross sections of the limb, showing bark, complete, 6 to 12 in. diameter, $6.00 to $25.00. Longitudinal sections; two 10x12 in. pieces cut from the same limb as panel, $15.00 and $30.00. Polished cross sections, complete, 2 to 5 in. diameter, $2.00 to $5.00

Cubes and flat paper-weights, beveled and handsomely polished on all sides, two sizes, $2.50 and $3.50. Selected pieces, with high natural polish, showing structure, but not complete sections, 2 to 6 in. diameter, 25c. to $1.50.

Garnet var. Almandite, Stickeen River, Alaska. These crystals are well known for their perfect symmetry and beauty. The dark red in the

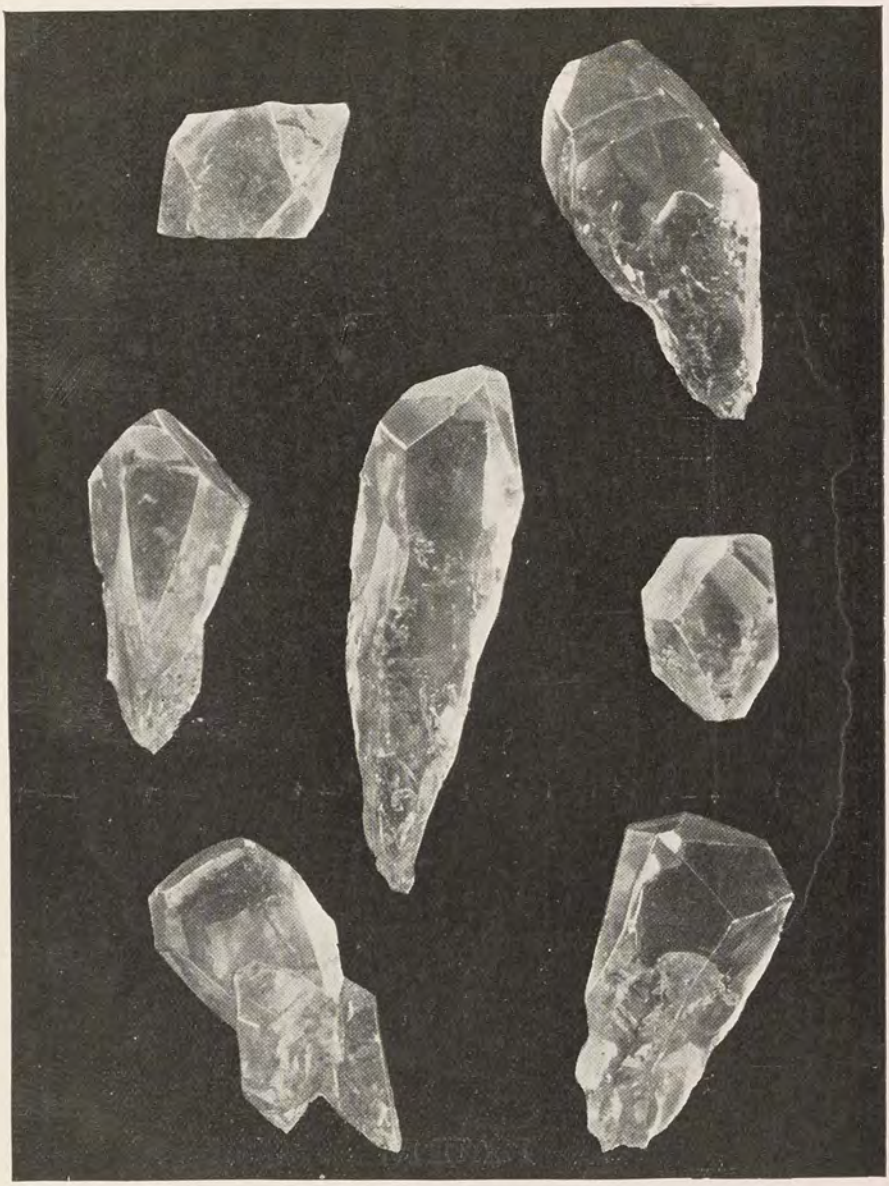


PLATE III.

Halite or Rock Salt from near Borax Lake, California.

Clear Crystals, showing puzzling Forms of the Cubo-octahedron, due to unequal development of certain Planes.



PLATE IV.

Polished Branch of Opalized Wood from Clover Creek, Lincoln Co., Idaho.

Showing the replacement in minute detail, of Wood Cells, Fibre, and Structure, by a lustrous brown and yellow Semi-opal. It is the most perfect and beautiful Petrifaction yet discovered.

sombre setting of gray mica schist is most attractive. Matrix specimens, 50c. to $5.00. Perfect detached crystals, ½ to 1 in. diameter, 15c. to 50c.

Opal var. Common Green-opal, Waterville, Wash. Generally accepted as the handsomest and cheapest semi-opal known. A mottling of red through the translucent olive green adds much to its beauty. Polished sections showing the blending colors, 75c. to $4.00. Selected rough specimens, with lustrous surfaces, 2 to 5 in., 25c. to $2.00.

Topaz, Juab Co., Utah. The brilliancy of cut Topaz is equalled by nature's polish on the rough crystals. Some show pretty inclusions of minute Quartz crystals. We have a large stock of these common but pretty natural gems, and offer selected crystals of flawless quality at 5c. to 25c. each, according to size. Small crystals at 10c. per dozen. Matrix specimens, 25c. to $1.00 each.



Giant Selenites, Wayne Co., Utah. Finely formed crystals of this transparent variety of Gypsum were found as much as four feet in length. We have one such valued at $15.00. Transparent crystals, one to two feet long; clear, sharp-edged and bright.
$3.00 to $10.00

Perfectly colorless and transparent cleavages 2 to 10 in. across. Very handsome. 5c. to $1.00

Showing moving bubbles. 50c. to $3.00

Model Selenites. Mahoning Co., Ohio. The adjective "model" is appropriate, as they are in reality perfect models of a simple and familiar combination of the monoclinic system. Their cheapness and unusual perfection make them in great demand for crystallographic study. They are generally transparent, often exhibiting the interior markings or "phantom."

Perfect unscratched crystals, several types, as illustrated, ¾ to 2 in. long, 10c. to 50c. each



Bruised or slightly imperfect crystals, 10c. per dozen to 15c. each, according to size. 1 to 3 perfect crystals in clay matrix. 25c. to $1.00

Martite, Millard Co., Utah. In groups of excellent crystals, 25c. to $1.00

Orpiment, crystallized, Mercur, Utah. Matrix specimens, with distinct and fair-sized crystals. 15c. to $1.25

Variscite and Wardite, near Camp Floyd, Utah. A new gem quality of green Variscite, forming the centre of pale yellow nodules, with a new

amorphous phosphate called Wardite. When polished it is one of the handsomest of ornamental stones. Sections showing both minerals, polished. $1.00 to $6.00

Thinolite, Pyramid Lake, Nevada. Large masses of distinct crystals ½ to 1 in. long. 15c. to 75c.

Gay-Lussite, Ragtown Lake, Nevada. Fair sized crystals on matrix. 25c. to $3.00

Moss Agate, Laramie Co., Wyoming. A pretty gray-blue with dark moss and tree-like markings. Rough pieces, 25c. to 75c.

Polished. 50c. to $2.00

Rose Quartz, Custer, S. D. Translucent pieces of fine pink color, 25c. to 75c. Polished. 50c. to $2.50

Stephanite, Lake Chelan District, Montana. From a new mine we have just received a large consignment of this rich silver ore, including some excellent crystals. They are of hexagonal aspect, quite brilliant, and prettily associated with Pyrargyrite and Galena on a white Calcite matrix. The best bring $1.00 to $5.00 each.



Marcasite Disks, near Sparta, Ill. An excellent example of radiated crystallization. Odd and quite pretty, being exactly the form of the "sand-dollar." 50c. to $1.00

Beryl var. Emerald, Crabtree Mt., Mitchell Co., N. C. European specimens have always brought high prices. From this new locality, we offer rich green hexagonal crystals of the true Emerald shade, in white Feldspar, presenting a bright contrast of color. 25c. to $1.25

Canada.

Molybdenite Crystals, Aldfield, Pontiac Co., Quebec. About ten years ago we received a few crystals which, though badly bruised, were quickly sold. Efforts to procure more failed, until a personal visit was made to the locality in 1894. For two months mining was carried on, dynamite being constantly required to remove the mass of rock overhanging the crystal-bearing vein. Many were destroyed, but in the end a number were saved which will rank always as valuable specimens. The work was abandoned when the last two weeks of labor resulted in uncovering but one crystal of any value, there being little prospect of finding more.

The crystals measured from ½ to 2 and sometimes 3 inches in diameter, having the glistening metallic lustre and characteristic blue-black color. Nearly all were saved in the hard Pyroxene matrix, the faces and angles being preserved in all their original perfection. They are generally thick hexagonal tables, often brighter and better defined than the large crystals shown in Plate V. Extra fine case specimens are worth $10.00 to $20.00 each. Descriptions of several higher priced specimens furnished on application. Crystals have heretofore been exceedingly rare. A large stock of good, typical examples were secured and are offered at low prices.

Cabinet specimens; large cleavages or smaller crystals in matrix. 25c. to $7.50



PLATE V.

Molybdenite.

Aldfield Township, Pontiac Co., Quebec, Canada.



PLATE VI.

Sulphur. Cianciana, Sicily.

Colemanite, Calico Borate Deposit, San Bernardino Co., California.

Zircon, near Eganville, Renfrew Co., Ontario. The twin crystals were first brought to the attention of mineralogists in 1881 by Dr. Foote. Since then we have secured both twins and simple crystals in choice matrix specimens. 50c. to $12.50

Apatite, near Eganville. Doubly terminated, sharp-edged hexagonal prisms, 2 to 6 in. long. 25c. to $6.00

Cacoclasite, Wakefield, Quebec. A puzzling pseudomorphous mineral, well crystallized. 50c. to $2.00

Perthite, "Sunstone." Perth, Ontario. A curious mixture of feldspars, having a pretty aventurine effect. 2 to 4 in. 25c. to 75c.

Fine polished pieces. 75c. to $2.00

Sperrylite, Sudbury, Ontario. A new species, arsenide of platinum, being the only known natural chemical combination of platinum with an element. $1.75 per gramme.

Pyrolusite, Tenneys Cape, Nova Scotia. Groups of brilliant black acicular crystals. 25c. to $2.00

Labradorite, Pauls Island, Labrador. A familiar and beautiful ornamental stone. Fine polished pieces reflecting shades of red, green, blue and violet. 35c. to $2.00

Klondike Gold. Locality is authentic.

Nuggets, various sizes, Bonanza Creek, $1.00 to $7.00

"Dust," in vials, El Dorado Creek, $1.00, $2.00 and $3.00

Mexico.

Boléo, near Santa Rosalia, Lower California. A stay of several weeks in this locality in 1894, together with the further purchase of all the specimens collected from time to time by M. Cumenge which he had for sale, has given us a wonderful series of these beautiful and rare minerals. Few minerals have excited such general interest among collectors and scientists as the two new species, Boléite and Cumengéite. The former, though not common, is comparatively inexpensive, the latter rarer species costs more. Although the leading museums and collectors have purchased, we reprint the following, principally a translation of extracts from Messrs. Mallard and Cumenge's description, published in *Comptes Rendus:*

Boléite. Occurs in cubes and cubo-octahedrons, sometimes a centimeter or more in diameter. Cleavage, perfect. H.=3—3.25. G.=5.08. Color, indigo blue. Several analyses by M. Cumenge and others, give the following composition: Silver, 8.70; Copper, 14.95; Lead, 49; Chlorine, 19.50; Water, 4.35; Oxygen, 3.50. This gives us the formula $PbCl_2+CuOH_2O+\frac{1}{3}AgCl$. or $3(PbCl(HO).CuCl(HO)+AgCl$.



Professor Groth gives to Percylite, the only old species resembling Boléite, the composition CuClHO.PbClHO. The absence of silver in Percylite, which is uniformly present in Boléite, makes Boléite a distinct species. It exhibits some interesting figures when cleaved parallel to the

face of the cube. It would appear that it is not cubic, but pseudo-cubic, and belongs to the quadratic system.

Perfect loose crystals, 2 to 7 mm. diameter, bright, clear-cut, and of beautiful blue color, 5c. to $2.00. A few larger, $3.00 to $5.00 each

Broken crystals one-third above prices.

Crystals on Bouglisite, Gypsum, clay, or Phosgenite and Atacamite matrix. Rare, 25c. to $5.00

Cumengéite. Occurs ordinarily in octahedral crystals but a few millimeters in diameter, in a gangue of white clay. Usually modified. The blue color is a little more violet than that of Boléite, and it has a bright adamantine lustre. Hardness is less than that of Boléite and more friable. G.–4.675. The composition, as determined by Messrs. Cumenge, Friedel and Fourment is Lead, 54.63; Copper, 16.77; Chlorine, 19.48; Water, 5; Oxygen, 4.12. This gives us the formula $PbCl_2.CuOH_2O$, differing from Boléite by the absence of $\frac{1}{3}$ AgCl.



"*Trillings.*" These crystals, probably the most beautiful of any ever discovered, are exceedingly rare in the perfect specimens which show three points up, no matter how they may be turned; imperfect crystals, which, however, show the trilling well, are not uncommon. They were at first supposed to be formed by the planting of the octahedral crystals on the faces of the cubic Boléite, but cross sections show the absence of Boléite as a central nucleus, as the bi-refracting portion is continued to the centre. In some cases the octahedrons are truncated. These latter were formerly supposed to be Boléite, but as we have all grades between the perfect octahedral pointed trilling and this form, they must be considered as Cumengéite.

Both species were found in small crystals, implanted on large white crystals of Bouglisite (a calciferous Anglesite, containing 20 per cent. of $CaSO_4$). These make most beautiful specimens, especially when examined under the lens.

Professor Friedel has produced artificially both Boléite and Cumengéite in minute crystals.

Loose trillings, acute or truncated, as shown in the illustration, 2 to 8 mm. diameter. 50c. to $4.00

The same on Bouglisite, 25c. to $4.00. (Large specimens in illustration.) A few extra choice ones at $5.00 to $10.00

Loose simple crystals (3 small crystals figured), 2 to 3 mm. 5c. to 25c.

The same, smaller, on Phosgenite or clay matrix. 25c. to $1.00

Bouglisite crystals. 10c. to 50c.

Sphærocobaltite. A pink carbonate of cobalt, heretofore almost unknown. Typical specimens. $1.00 to $5.00

Remingtonite. Described in 1852, but specimens were unknown in any of the great collections until discovered at Boléo by Dr. Foote. It

occurs with Gypsum, in crystalline masses. Its delicate rose tint is in pretty contrast with green Atacamite. But a small amount was found.
50c. to $3.50

Calcite, Guanajuato. Several trips were made to Mexico and the old mining districts of Guanajuato, Zacatecas, Queretaro and other points visited. We have a good stock of the now famous Calcites, embracing curious types, such as the flat "Papierspath" and various other modifications, some neatly mounted on Amethyst. 25c. to $3.00

Apophyllite. Shapely groups of brilliant and almost opalescent crystals, clear and perfect. Rare. $3.00 to $15.00

Valencianite. A kind of Adularia in white crystals on Quartz.
25c. to $2.00

Mazapilite. An exceedingly rare mineral, first brought from Mexico by Dr. Foote, and fully described by Prof. G. A. Kœnig in 1889. It is an arseniate of calcium and iron, occurring in small black, well-developed orthorhombic prisms. $1.00 to $3.00

Cuprodescloizite. A Descloizite containing 8 per cent. of copper. Occurring in drusy botryoidal masses; 1½ to 4 in. 25c. to $2.50

Polybasite. Crystallized specimens. $1.50 to $5.00

Pink Grossularite. A pretty rose garnet in marble. Polished slabs.
50c. to $4.00

Perfect detached crystals. 10c. to 50c.

Opal. Rough opals in matrix, as found in the Queretaro Opal Mines. Milky, fire and precious grades. 15c. to $1.50

Cut milky opals at one-quarter former prices. 15c. to $1.50

Mexican Onyx, Argentite, Pyrargyrite, Embolite, etc., etc.

England.

Special trips to Cumberland and Cornwall, together with recent consignments from the Bigrigg and Stank Mines, afford us a large assortment of selected material.

Calcite, "Butterfly Twin." So called because of the imitative shape assumed. An odd and pretty illustration of twinning. ¾ to 3 in.
25c. to $2.50



Calcite, Hexagonal and Scalenohedral. In groups as showy and as cheap as Rock Crystal. 25c. to $3.00

Witherite. Large six-sided pyramidal crystals (orthorhombic twins), on matrix.
25c. to $4.00

Smoky Quartz on Hematite. Brilliant and perfect dodecahedral Quartz crystals, on sparkling surface of velvet-black Hematite. Very handsome. 35c. to $2.00

Aragonite. Groups of "Cathedral Spires." 25c. to $2.00

Barytocalcite. Distinct crystals in groups 1½ to 4 in. 25c. to $2.00

Fluorite. A great variety of colors, including yellow, green, purple, blue, etc. Handsome and cheap. 10c. to $2.00

Barite. Delicate transparent blue, tabular crystals, prettily grouped with white Calcite. Other forms, including the "Golden Phantom," a clear honey-yellow crystal with internal parallel lines. 15c. to $2.00

Cassiterite, Cronstedtite, Siderite, Olivenite, Torbernite, Cuprite, Modified Fluor, Stannite, etc., etc.

Matlockite. Secured through the purchase of an old collection. Now very rare. Good sized crystals on matrix. $3.00 to $10.00

France.

Siderite. Purchased from a collection formed many years ago. Fine large rhombs in groups. 50c. to $5.00

Allemontite. Metallic masses showing bright fracture. $1.25 per pound, ½ the European retail price. 25c. to $2.00

Axinite, Fontainebleau Limestone, Octahedrite, Aragonite, Offrétite, Dauphiny Quartz, Pyrite, etc.

Sicily.

Extended trips were made to Sicily, Elba, Sardinia and important localities on the peninsula. More than seventy boxes of minerals were thus obtained, which, with consignments received later, comprise probably a finer and larger stock of Italian minerals than exists even in Europe. Magnificent Sulphurs and other minerals once obtained in abundance are now being sold at surprisingly low prices.

Sulphur. It is impossible to describe the superb beauty of this mineral to those unfamiliar with it, and our illustration (Plate VI) gives but a poor idea of its appearance. Three large groups, rivalling in splendor of color, lustre and perfect form, anything in the great museums, are offered at $15.00, $25.00 and $50.00 respectively. Equally beautiful groups 2 to 8 in. 25c. to $8.00

Detached crystals, transparent, 1 to 2 in. 25c. to $1.50

Selenite. Perfectly transparent "fish-tail" twins. Very showy as case specimens. 6 to 12 in. 75c. to $4.00

Selenite inclosing Sulphur or Aragonite. One of the oddest and loveliest examples of the interesting phenomenon of inclusion. $1.00 to $10.00

Melanophlogite. A pseudomorphous form of silica, occurring in translucent yellow cubes on Sulphur. 25c. to $1.50

Aragonite. Splendid groups of six-sided prisms (orthorhombic twins, showing the striæ plainly). The crystals are pale blue or yellowish, very brilliant and often measuring over 1 in. across. 25c. to $5.00

Two larger groups. $15.00 and $20.00

Calcite pseudomorph after Aragonite. These curious six-sided shell-like forms show the partial replacement of the original prism,

the interior being hollow. Odd and exceedingly attractive. Three large ones, $7.50, $15.00 and $20.00.

Choice specimens, 3 to 8 in., 50c. to $4.00

Hauerite, Selensulphur, Simetite, Celestite, etc.



Elba.

Hematite. These wonderful crystallizations have been long and widely known. The little group shown here is one of many inexpensive specimens offered. Crystals, ½ to 1½ in., are coal-black, brilliant, sharp and often display a beautiful iridescence. 1½ to 6 in. 10c. to $4.00

Pyrite. The commonest form is the pyritohedron, frequently modified. A pretty and typical twinning is illustrated. 1 to 1½ in. 50c. to $1.50



Simple crystals, ¾ to 2 in., 15c. to $1.00

Limonite pseudomorph after Pyrite. Pyritohedron. 25c. to 75c.

Sardinia.

Phosgenite. Brilliant, well-formed crystals, some over 1 in., on matrix. Prices are low for so rare a mineral. 75c. to $5.00

Anglesite. Our specimens bear out the assertion that this locality produces the finest Anglesites in the world. Clear-cut, sharp crystals, colorless to gray-black; all of a dazzling adamantine lustre.

Neat matrix specimens, 50c. to $3.00

Vesuvianite, Leucite, Sal Ammoniac, Anorthite, Meionite, Sodalite, Chondrodite, and other Vesuvian minerals.

Meneghinite. The mines were worked in the days of the early Romans, and have been long closed down. The species is exceedingly rare, but we offer crystals ½ to 1 in. long. 50c. to $1.00

Heteromorphite, Topazolite, Violan, Mimetical Pyrite, Cavernous Quartz, etc.

Belgium.

A consignment just in, includes the following species. Few are attractive in appearance nor well crystallized; but many are very rare, and what is important, correctly named. Typical examples are furnished at 50c. to $1.00

Klementite, Ottrélite, Sericite, Richellite, Koninckite, Destinezite, Koppite, Magnoferrite, Moresnetite, Skolopsite, Delvauxite, Rubellan, Bastonite, Monheimite, Davreuxite, Nosite, Hyalosiderite, Pholerite, Strengite, Breislakite, Strontianite, Faujasite, Libethenite, Andalusite, Sartorite, Grunauite and other rarities.

Germany and Austria.

Importations from time to time afford us a good series of species.

Tetradymite, crystallized. Distinct crystals, measuring 2 to 5 mm. Matrix specimens. 50c. to $3.00

Loose, complete crystals. 5c. to 25c.

Stephanite. Bright symmetrical crystals, 25c. to $2.50

Metacinnabarite, crystallized. Very small but well-defined crystals on matrix. Exceedingly rare. 50c. to $2.00

Roselite. Small crystals in matrix, 75c. to $3.50

Pucherite, Smaltite, Chloanthite, Proustite, Annabergite, Clausthalite, Wolframite, Ullmannite, Fluorite, Laumontite, Niccolite, Carnallite and other Stassfurt Salts, Tetrahedrite, etc., etc.

Greece.

We were the first to bring to America the rare species found at Laurium, a personal visit securing many interesting species.

Laurionite, described by Vom Rath, is the best example known of a metallic mineral species formed within historic times by the combined agency of man and nature. It is a well-crystallized, orthorhombic oxychloride of lead, formed by the action of sea water on the rich slag dumped into the sea about two thousand years ago, when Pericles was building the Parthenon from the profits of the mines of Laurium. The strange circumstances of its formation, its distinct crystallization, adamantine lustre and association with perfect little Phosgenite crystals, in cavities of the gray slag, make it of especial interest. 50c. to $3.00

Serpierite. A rare sulphate of copper and zinc. Small crystals of fine blue color in cavities. 25c. to $3.00

Smithsonite, Adamite, Jarosite, Scorodite, and the rare Fiedlerite.

Lorandite on Realgar, Allchar, Macedonia. A new and rare sulpharsenide of Thallium. Distinct crystals, $1.25 to $6.00

Norway and Sweden.

The more important localities were visited. At Arendal a small steamer was hired, and many points reached, which are inaccessible by the ordinary modes of travel. These special efforts furnished more than one great European collection with specimens of species formerly unrepresented. Many of these rarities are found only at Scandinavian localities, and were almost unknown in American collections.

The species collected and purchased numbered over one hundred. The careful study given these unfamiliar minerals by high authorities insured correct labeling.

Eudidymite. Heretofore rare. Excellent crystals of typical monoclinic form, detached and grouped. 25c. to $1.50

Native Lead. Very rare. Flattened masses of the pure metal, on matrix. $1.00 to $5.00



Brandtite. Small crystals on matrix. 50c. to $3.00

Euxenite. Shining black masses. At the rate of $3.50 per pound, less than European prices. Also crystallized. 25c. to $2.00

Thorite. Detached crystals of two types: (1) Long prisms and pyramid. (2) Low pyramid with short prism, doubly terminated. ½ to 1 in. 25c. to $10.00

Rhodonite var. Paisbergite. One of the few showy Scandinavian minerals. The crystals are of exquisite pink color, bright and of well-defined triclinic form, though of different habit from the better known Fowlerite. Grouped in cavities of hard rock. 1½ to 4 in. 25c. to $5.00

Sunstone (Oligoclase); also *Chatoyant Microcline.* Pretty polished pieces of very fine quality. $1.00 to $2.50

Vesuvianite. Well crystallized on matrix. 50c. to $2.00

Chondrodite. Large, grayish-green crystals. 75c. to $3.00

Ganomalite; also Cerite. Massive. 25c. to $2.00

We mention a few of the crystallized species still offered in good specimens. For others see VIII, Alphabetical Price List.

Allactite, Bjelkite, Brannite, Caryinite, Cleveite, Cobaltite, Gadolinite, Glaucodot, Hausmannite, Inesite, Keilhauite, Kentrolite, Längbanite, Malacon, Mosandrite, Orangite, Pinakiolite, Pyrosmalite, Sarkinite Scabite, Wagnerite and Æschynite.

Russia.

Topaz. Splendid crystals, suitable for cutting gems, colorless to delicate blue and well formed, ¾ to 1⅛ in. $5.00 to $15.00

Platinum Nuggets. Rare. $1.50 to $2.00

Malachite. Fine polished specimens. $1.00 to $3.00

Dioptase. Rare and beautifully crystallized. $2.00 to $10.00

Zircon, Wiluite, Clear Golden Beryl, Aquamarine, Alexandrite, and the very rare Crocoite.

Australia.

It is strange that the continent of Australia, with such unlimited mineral wealth and boasting a long catalogue of species native to her mines and quarries, should be so poorly represented in the European collections. Her mineralogy has been ably and exhaustively studied by leading chemists and crystallographers, but no systematic collecting and exporting of specimens has been done. Magnificent crystallizations of Crocoite, Cerussite, Phacolite, and scores of others are recorded, but very few specimens in the past have been exhibited. The introduction of these minerals in Europe is now rendered possible through the services of an Australian mineralogist, who is collecting as our exclusive agent. He has not only a scientific appreciation of minerals, but likewise the collector's instinct, which knows and gets a good specimen. Localities are visited expressly

in our interest; collections are purchased, and everything, including the very best, is at once shipped to us. We are selling at reasonable prices the finest Vivianites, Gmelinites, etc., ever seen, and such things as Newberyite, which were formerly unknown. A letter just received announces the shipment of some fine crystallizations of Newberyite, to arrive about the time this is published. A brief account of the trip to the Skipton Caves, and a plan of the interior, was most interesting. We quote from the letter:

"They are situated some 30 miles southwest of Ballarat, on beautiful undulating but somewhat stony plains. Hired a horse and buggy and took a guide with me on the first visit. We improvised lights made of hessian steeped in kerosene, and after descending a few feet into one of the numerous crater-like depressions, reached the entrance, where a crawl of a few yards led us into the main chamber. It was very dark; a darkness that could almost be felt, and also chill and dampen one. The basaltic roof varies from 20 feet to 2 or 3 feet high. Only a comparatively small portion of the guano is rich in minerals, and a good deal of that has been used as a fertilizer, so that it is very probable that Newberyite will soon be exhausted. I was somewhat disappointed at not being able to find Hannayite, which has been found there. I took a number of samples from various parts and examined them by daylight, but without success."

Newberyite, An insoluble, hydrous phosphate of magnesium, occurring in irregular aggregations of orthorhombic crystals. The individuals are generally thin tabular, with bright faces; rarely thick regular crystals (Dana, Fig. 2) were found. Specimens like the one illustrated, 25c. to 50c. (Selections for future orders will be made from consignment now en route, containing much better crystals.)



Struvite, Skipton Caves. Small crystals. 5c. and 10c.

Phacolite, Richmond, near Melbourne. A variety of Chabazite, also known as Seebachite or Herschellite; formerly found in a quarry at Richmond. Occurs in "composite twins of great variety and beauty" (Dana). Crystals varying from ¼ to ½ in., are scattered attractively over a dull black basalt. The strong reflections from the crystal faces destroy the detail in the illustration attempted on Plate VII. It is safe to say that no one of the beautiful Zeolite minerals is handsomer than this, the close-cut, brilliant white crystals, being well displayed against the dark background. We have also some very rare spherical twinnings. Prices, 25c. to $4.00

Phillipsite, Richmond. Colorless and often transparent crystals on dark basalt. Three types of perfect crystals. 1. The simple twin (Dana, Fig. 1) is uncommon; 2. Cruciform twin (Fig. 2) is the usual type; 3, more rarely a composite form (Fig. 4), which is a combination of three cruciform twins, suggestive of the Cumengéite trillings. 25c. to $3.00

Aragonite, Richmond. White acicular crystals grouped on basalt. 25c. to $1.50

Ferrocalcite, Richmond. A unique variety of Calcite occurring in brown tufts of acicular crystals, as shown in Plate VII. It resembles Aragonite in habit and Stilbite in color. Also *Sphærocalcite* in globules on matrix. 25c. to $2.00

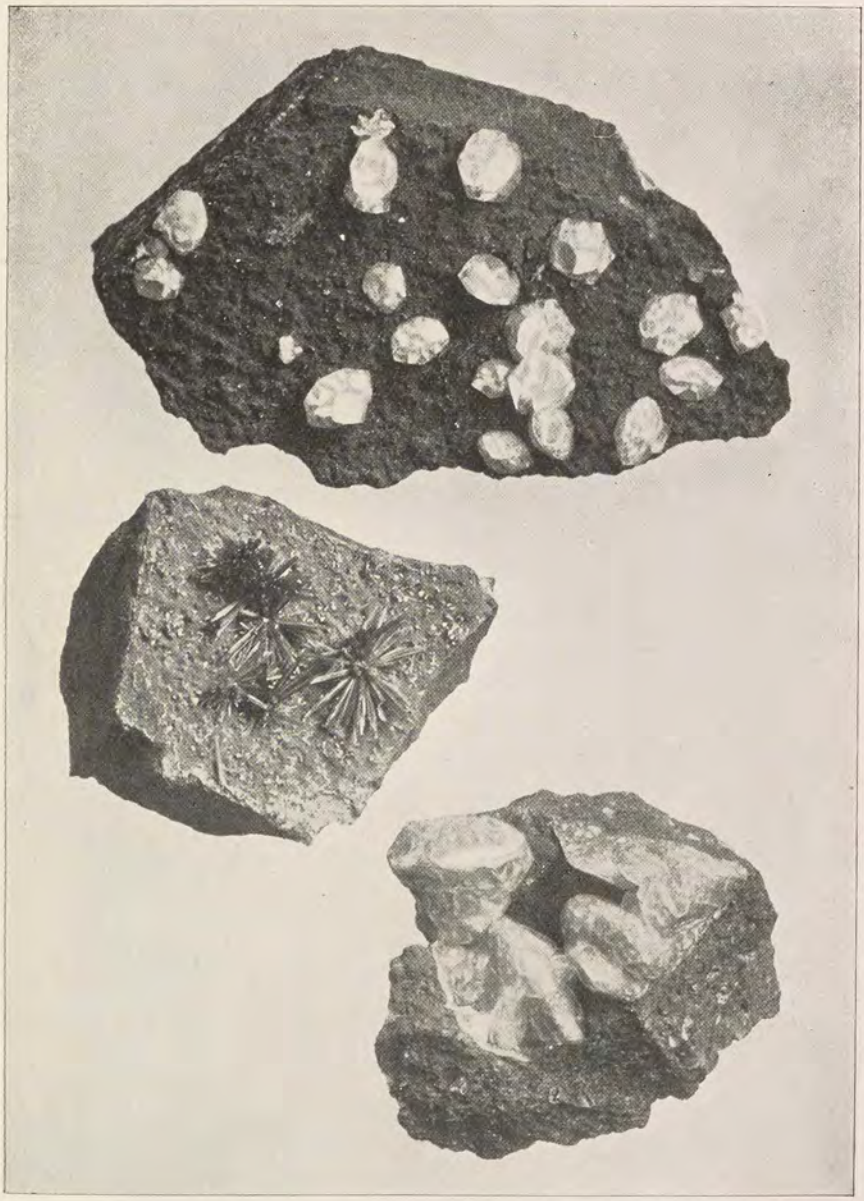


PLATE VII.

Rhombohedral Twin Crystals of Phacolite and Acicular Calcite, from Richmond, near Melbourne, Victoria.

Gmelinite, from Flinders Island, North Coast of Tasmania.

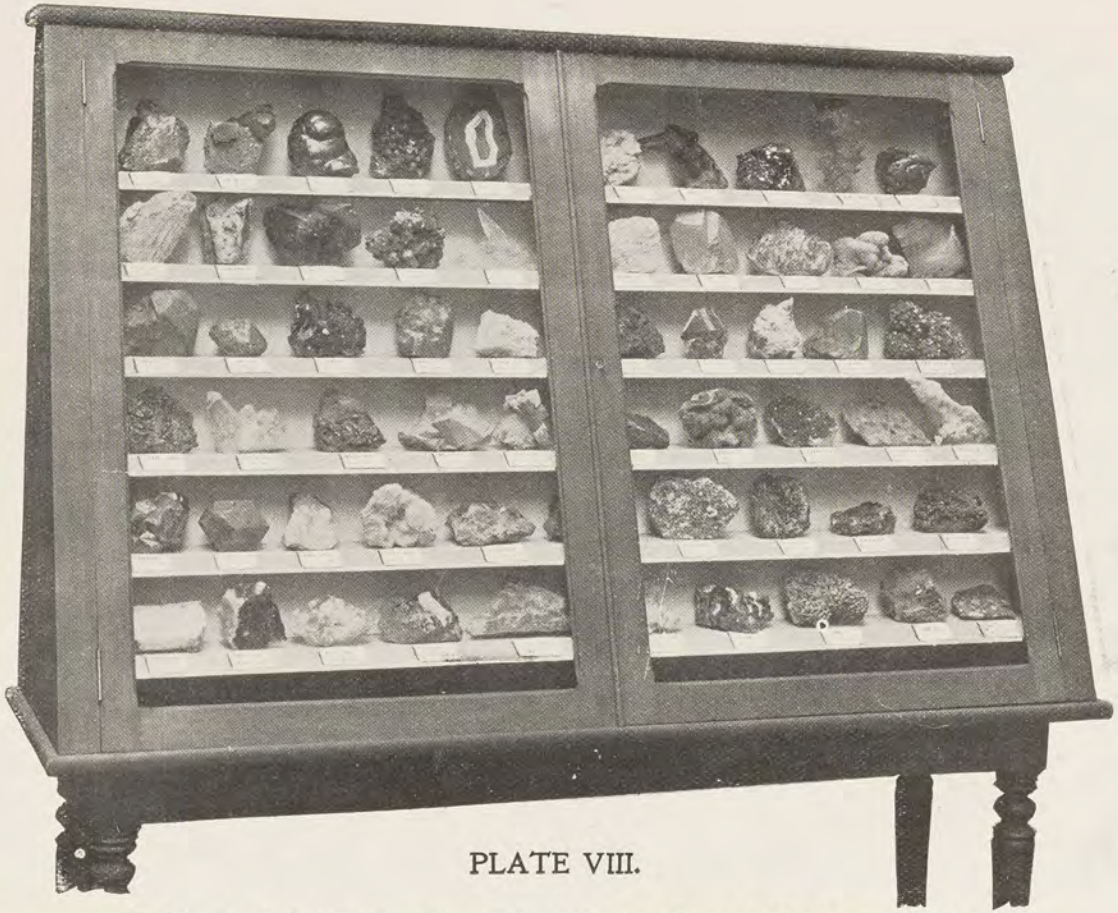


PLATE VIII.

Collection of Specimens averaging 4¾x3½ in. (Part of No. 13 or No. 18).

Gmelinite, Rare. A trip to the Island of Flinders, off the north coast of Tasmania, yielded the finest specimens ever seen of this mineral. Crystals are six-sided twins, flesh-red color and ¼ to ¾ in. diameter. Some are exceedingly sharp and brilliant, while the largest (Plate VII) are generally duller, often associated with Analcite and Natrolite.
25c. to $4.00

Mesolite, Flinders. Pretty specimens consisting of spherical, snow-white tufts coating the trap rock. 25c. to $1.00

Analcite, Flinders. In brilliant, limpid crystals, lining cavities of the trap. Some are dotted with pretty balls of Natrolite. 25c. to $1.00

Sphærostilbite, Flinders. This interesting form of Stilbite occurs in smooth white spheres of waxy lustre, daintily mounted on the tips of slender Natrolite crystals. Calcite of the primitive form, coated with a transparent Stilbite, is a frequent association; 2 to 4 in. 25c. to $2.00

Vivianite. The Falls of the Wannon River, Victoria, were visited to collect the wonderful crystallizations reported. The mineral was found imbedded in a volcanic ash, directly under the Falls. It forms aggregates of crystals, the interstices between the bladed crystals being filled with ash, requiring tedious cleaning. Two types were noted, either probably finer than anything yet recorded from other localities.

1. Prismatic bluish-green crystals, exceedingly brilliant, clear and well defined. Their magnificent color, flawless quality and lustre, afford internal lights and reflections which equal those of a Sapphire. Crystallizing freely in limestone cavities. Rare.

2. Flat crystals ½ to 1½ in. long and ⅓ as broad, in shape not unlike the blade of an oar. Smooth and opaque. These aggregates make attractive and unique specimens. 75c. to $4.00

Embolite, Broken Hill Mines, N. S. W. Regularly mined as an ore of silver on this rich property, and therefore inexpensive, though former prices were double and treble those now asked. Pure masses of sponge-like and branching forms; also plates in Kaolin. 25c. to $1.00. Perfect little cubic crystals in cavities of Limonite or Quartz. 50c. to $2.00

Cerussite, Broken Hill. Six-rayed stellate twins and other beautiful forms; large crystals. Also pure massive pieces. 50c. to $2.00

Linarite. Small but unusually perfect and brilliant crystals of fine blue color, in Anglesite matrix. 50c. to $1.00

Crystallized Smithsonite, Argentiferous Tetrahedrite, Galena cubes altered to Anglesite, Arborescent Native Copper, Crystallized Iodyrite, Anglesites and other Broken Hill minerals.

Africa.

The long abandoned Antimony mines at several points in Algeria were visited, and by blasting and careful searching, excellent specimens were secured.

Nadorite. Solid masses containing groups of fine crystals, some measuring over ½ in. Occasionally pretty little Cerussite crystals are found in the cavities. 2 to 5 in. 50c. to $2.00

Senarmontite. Perfect, transparent crystals in groups. Also duller crystals imbedded in matrix. 25c. to $3.00

Valentinite. Yellow masses; fibrous structure. 15c. to $1.50

Diamond Crystals, Kimberly Mines, South Africa. Selected octahedrons. 75c. to $8.00

"*Tiger Eye*," (*Crocidolite altered to Quartz*). Griqualand, South Africa. Rough pieces, 2 to 4 in. 10c. to 75c.

Polished slabs, very beautiful, both of yellow and the original blue. 15c. to $3.00

True Crocidolite. A blue, asbestus-like mineral. 10c. to 75c.

Other Foreign Localities.

Calomel, Servia. Well crystallized. Extremely rare. Two specimens at $15.00

Rutiliated "Quartz, Flêtches d'Amour," Brazil. Long golden red needles of Rutile, piercing masses of Rock Crystal. Choice polished pieces. 50c. to $9.00

Agate, Banded, black and red. Polished. 10c. to $2.00

Heulandite and Epistilbite in fine crystallizations from Iceland. $1.00 to $8.00

Native Terrestrial Iron, Disco Island, Greenland. Pieces of the mass found and originally described by Prof. Nordenskiold. Differing from others from the same locality, in that it holds disseminated throughout the mass pieces of the trap rock in which it was imbedded when found, thus proving beyond question its terrestrial origin. Pieces 25c. to $8.00 (about $3.00 to $4.00 per pound). Brightly polished on one side, also etched if desired. $1.50 to $10.00

Cryolite, crystallized. Ivigtuk, Greenland. 50c. to $6.00. Fine white masses, 2 to 6 in. 10c. to 50c.

Eudialyte. Well-defined crystals, $\frac{1}{2}$ to $\frac{3}{4}$ in. on matrix. 25c. to $3.50

Columbite, Pachnolite, Thomsenolite, Ralstonite, crystallized. 25c. to $3.00



PLATE IX.

Sample of Specimen and Printed Label. Used in all Collections, except Fragment Sizes.



PLATE X.

Collection of Perfect Crystals (No. 79).

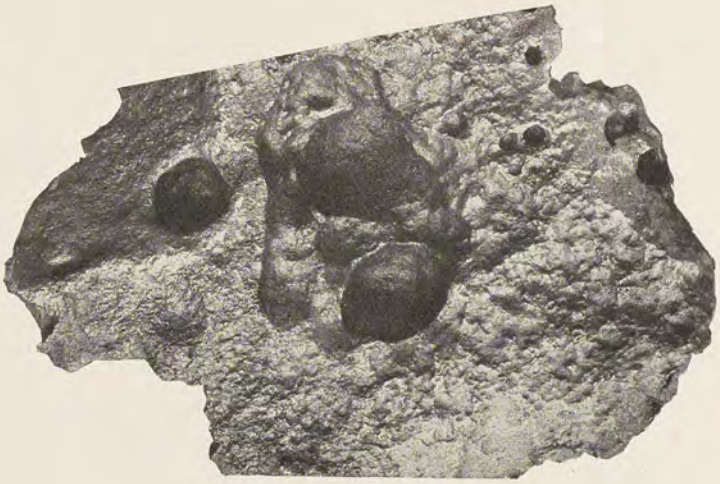
All inexpensive Collections of $1\frac{1}{4}$ in. Specimens and $\frac{3}{4}$ in. Fragments, are put up in similar Quartered Oak Compartment Cabinets.



XI.

The Sacramento Mountains Meteorite.

The above Print was made direct from a Polished Slab, etched with Acid to show Crystalline Structure, or "Widmannstatten Figures."



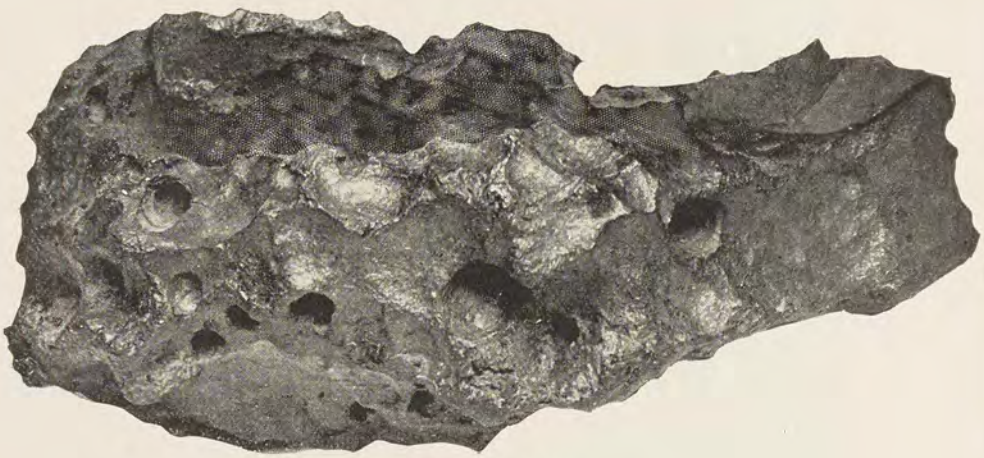


PLATE XII.

Meteoric Irons.

The upper Mass is from the Sacramento Mts., Eddy Co., N. M. Weight, 414 lbs. General dimensions, 18 in. high x 24 in. wide x 6 in. thick. The base and top were sawed and polished.

The lower is the original large Mass of Diamondiferous Iron from Canon Diablo, Ariz., described by Dr. A. E. Foote. Weight, complete, 201 lbs. General dimensions, 19x10x7 in.



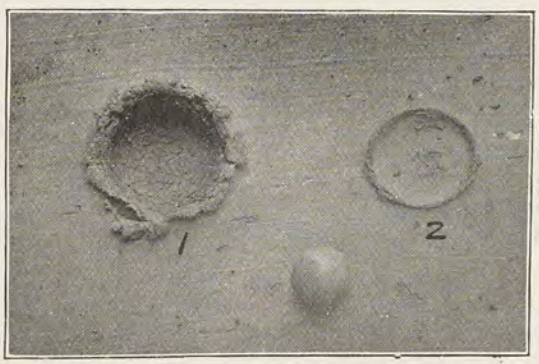
PLATE XIII.

Diamondiferous Meteoric Iron found at Canon Diablo, Arizona.

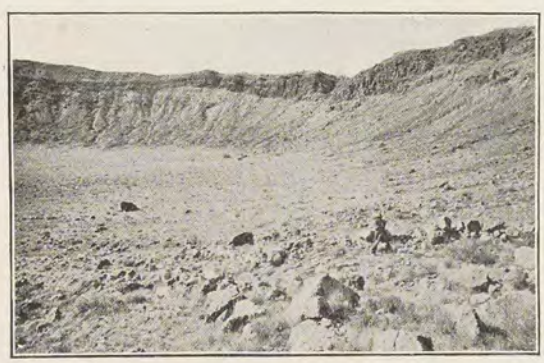
On cutting this Mass, a Diamond was found at the point lettered "D." The faint circle of scratches was produced by the loosened fragments. Analysis was made by Prof. G. A. Koenig. A Description and an Announcement of the Discovery was read by Dr. A. E. Foote, before the American Association for the Advancement of Science, Aug. 20th, 1891.



The Limestone Crater of Arizona, Coon Butte, as seen from the south. Photograph of a model by Mr. Victor Mindeleff.



Craters made by throwing clay balls at a clay target. A ball of the same size is shown. 1 shows the effect of high velocity, 2 of low.



Interior of Coon Butte, as seen from the talus on one side. The cliff below the rim is of limestone.



PLATE XIV.

Wall Cabinet.

Selected polished Stones, Gems, and crystallized Minerals.

II.

COLLECTIONS.

A professor of mineralogy at one of the oldest seats of learning in Europe, speaking of an order about to be placed with us, said: "I want *good* working specimens—I like this Opalized-wood because it shows plainly that it is a petrifaction, and this Calcite because it does not need a pointer to call attention to its form." That is precisely the aim of our collections. Throughout, they *illustrate* the study, a thing which poor or carelessly selected specimens can never accomplish. A few examples of the crystallizations used, are illustrated in "I. New Arrivals."

Correct and accurate labeling is of the highest importance. A neatly printed label, giving name, composition and locality, accompanies every specimen. (See illustration of labeling and mounting, Plates IX and X.) Prices can be quoted on any size of specimens desired.

Substitutions and changes will be made without charge, except in "stock" collections, or when very rare kinds are desired. It is claimed for our collections that they are not only lower priced, but are prepared with greater care, have a greater number of good crystallizations and typical specimens, are labeled better, and present a handsomer appearance than any offered for sale elsewhere. We have in stock, selected and packed ready for shipment immediately on receipt of order, all collections catalogued, except those marked with an asterisk (*). The latter require several days for preparation.

The value of specimens is not measured simply by size. Any of the following sizes can be put up to order in poorly crystallized or massive specimens, at lower figures than quoted here for good crystallizations.

Probably no department of our business is more favorably and widely known than that furnishing educational material. We received the highest award and medal given for "*Collections of Minerals*" at the Centennial, Philadelphia, 1876. Also medals or diplomas at the Exposition of St. Louis, 1875; New Orleans, 1884–86; Louisville, 1886; London, 1887; Paris, 1889.

A. STANDARD COLLECTIONS EVENLY COVERING THE SCIENCE.

Advanced.

Arranged according to the generally accepted classification of Dana ("*System of Mineralogy*," 6th ed.), but can be revised as purchasers may desire.

***No. 1. Complete Type Collection. 1,200 specimens, averaging 4¾x3½ in., $1,800.**

Intended for an institution desiring a collection, which may be fairly accepted as complete. Over five hundred distinct species are represented, though some specimens are of necessity below the average size; those omitted are generally very rare and not to be found in the largest museums. In addition are included all essential varieties and types, embracing variations of form and color, and yet not encumbering the collection with merely local examples. It is from a stock of the extent and scope of that to be found only in our establishment, that such a series of specimens can be selected. Catalogue and full description of Nos. 1 to 4 on application.

***No. 2. Complete Type Collection. 1,200 specimens, averaging 3½x2¾ in., $900.**

The same as No. 1, in smaller specimens. It is quite as good for all practical purposes, though not making as imposing a display as the preceding.

***No. 3. Specialists' Complete Type Collection. 1,200 specimens, averaging 2½x2 in., $450.**

Arranged for specialists or advanced students, though serving the purpose of institutions desiring a complete collection at a relatively low price. (Same list as for No. 1.)

***No. 4. Specialists' Complete Type Collection. 1,200 specimens, averaging 1¼x1¼ in., $180.**

The specimens selected are good examples of their kind, but often lack the perfect crystallization exhibited in the preceding. (Same list as for No. 1.)

***No. 5. University Collection. 600 specimens, averaging 4¾x3½ in., $750.**

The complete list (following No. 12) is arranged to include such minerals as are taken up in most university or college courses. All species chemically important and essential in the illustration of a comprehensive and thorough course are represented. Examples are shown of all ores and economic compounds which the miner or prospector may wish to

recognize, as well as the numerous varieties of well-known minerals with which every student should be familiar.

The list contains 375 distinct species, and a careful elimination of obscure and unimportant names has been observed. As outlined, this collection meets the requirements of a purely scientific course, and is an invaluable aid in the technical and professional work of laboratory or field. The specimens are in every respect equal to those of No. 1, about one-half being well crystallized, and the remainder, typical crystalline or massive examples of minerals rarely or never occurring in good crystals.

***No. 6. University Collection. 600 specimens, averaging 3½x2¾ in., $375.**

The same as the preceding, except that the specimens are smaller.

***No. 7. Specialists' Collection. 600 specimens, averaging 2½x2 in., $200.**

An improvement on a similar collection formerly listed by us at the same price. The present list is that of the "University Collection."

***No. 8. Specialists' Collection. 600 specimens, averaging 1¼x1¼ in., $75.**

Like the preceding, this is an improvement on our old collection—that listed at $87.50.

***No. 9. College Collection. 360 specimens, averaging 4¾x3½ in., $300.**

The list (which follows No. 12) omits the starred (*) names. No effort is spared to make this as useful an advanced collection as the limited number of specimens will permit. The tendency usually is to pass the "rarities" and take only the most important kinds in the choosing of a list for either educational or practical work. The "*College Collection*" is, therefore, the most popular of the larger collections. As in the others, every care is exercised that it may thoroughly illustrate the descriptions in the text-books and serve as a useful adjunct to private study or class work. It makes a splendid display, and includes a large number of very beautiful specimens.

***No. 10. College Collection. 360 specimens, averaging 3½x2¾ in., $150.**

In every way like the preceding, except that the specimens are smaller.

No. 11. Students' Collection. 360 specimens, averaging 2½x2 in., $75. Drawer Cabinet, with pasteboard trays, $13.75 extra.

This is arranged according to the same list, and the same care is taken in preparation as with the larger sized collections.

No. 12. Students' Collection. 360 specimens, averaging 1¼x1¼ in., $25. Compartment Cabinets, $4.80 extra. Weighing, when packed with cabinets, about 66 pounds.

According to the "College Collection" list which follows.

The following list complete, forms the UNIVERSITY COLLECTION of six hundred specimens. The list omitting the starred names forms the COLLEGE COLLECTION of three hundred and sixty.

ABBREVIATIONS.—Cryst.—crystallized, generally groups of good sized, distinct crystals on gangue; xl (or xls.)—detached crystals; xline—crystalline structure; mass.—massive.

I. Native Elements.

Diamond, xl.
Graphite.
Sulphur, cryst.
*Selensulphur, cryst.
Arsenic.
*Allemontite, xline.
Antimony, xline.
Bismuth, xline.
Gold, in quartz.
* " dust and grains.
* " var. Electrum, xls.
*Silver, wire.
" plates.
* " with copper.
Copper, arbores., xls.
" large mass.
* " in conglom.
Mercury.
*Lead.
Platinum.
*Iridosmine.
*Iron, terrestrial, xline.
" meteoric. "
* " " stone.

II. Sulphides, Selenides, Tellurides, Arsenides, Antimonides.

Realgar, cryst.
Orpiment, cryst.
Stibnite, cryst.
Bismuthinite, cryst.
Tetradymite, "
Molybdenite, xl.
*Dyscrasite.
*Domeykite.
Argentite, xl.
*Hessite, xline.
Petzite, xline.
Galena, xl.
" cleavage.
" argent. granular.
Chalcocite, cryst.
" massive.
Sphalerite, cryst.
" ruby, cryst.
" mass. gray.
* " Schalenblende.
" fibrous.
* " cadmiferous.
*Metacinnabarite.
*Tiemannite.
Alabandite.
Cinnabar, cryst.
*Covellite.
Greenockite.
*Wurtzite.
Millerite, xline.
Niccolite.
Pyrrhotite.
Bornite.
Linnæite.
Chalcopyrite in Calcite.
" xls. on Dolom.
Stannite.
Pyrite, pyritohedron.
* " octahedron.
" cube.
* " " distorted.
" massive.
Hauerite, 2 xls.
Smaltite.
Cobaltite, cryst.
*Gersdorffite, "
*Sperrylite.
Marcasite, "cockscomb,"
" disk (radiated xls.)
Löllingite.
* " var. Leucopyrite.
Arsenopyrite, cryst.
*Glaucodot, 2 xls.
Sylvanite, cryst.
*Calaverite, xline.
*Nagyagite, cryst.
*Kermesite, "

III. Sulpho-Salts.

*Emplectite, cryst.
Jamesonite, "
Bournonite, "
Pyrargyrite, "
Proustite.
Tetrahedrite, cryst.
* " mass.
*Tennantite, cryst.
*Meneghinite, "
Stephanite, "
Polybasite.
*Enargite.
*Argyrodite.

IV. Haloids.

Halite, transp. cleav.
" granular.
Sylvite. cryst.
Sal Ammoniac.
Cerargyrite, cryst.
Embolite, "
Fluorite, group ameth. xls.
* " " blue "
" " yellow "
" green octah. cleav.
" white granular.
*Fluorite, Antozonite.
Cryolite, cryst.
Laurionite, "
Atacamite, "
*Nocerite.
Carnallite.
*Tachyhydrite.
*Pachnolite, cryst.
*Thomsenolite, "

V. Oxides.

1. *Oxides of Silicon.*

Quartz, group, xls.
" 6 xls.
* " cavernous, xl.
" geode (drusy).
" var. Amethyst, xls.
" " Rose.
* " " Citrine,
" " Smoky, xl.
" " Milky.
* " " Sapphire.
* " " Aventurine.
* " " Chloritic, xl.
" " Chalcedony.
* " " Carnelian, pol.
* " " Chrysoprase.
* " " Plasma.
" " Bloodstone.
" " Agate, pol.
" " Moss Agate.
" " Onyx, pol.
" " Flint.
" " Hornstone.
" " Jasper.
" " Flexible sandstone.
" " Jasperized wood.
" " Tiger Eye (pseudomorph after Crocidolite).
Tridymite.
Opal, var. precious.
* " " fire.
" common green.
* " Opal-agate.
" Opalized wood.
" Hyalite.
* " Geyserite.
" Tripolite.

2. *Oxides of Semi-Metals.*

*Senarmontite, cryst.
*Valentinite.
*Molybdite.
Cervantite.

3. *Oxides of Metals.*

*Cuprite, cryst. octahedral.
" " capillary.
" massive.
*Periclase, cryst.
Zincite.
*Tenorite, cryst.
" Melaconite.
*Corundum, Sapphire, xl.
* " Ruby, "
" ord., xl.
" cleavage.
" Emery.
Hematite, cryst.
* " var. Micaceous.
" " Specular ore.
" " Kidney "
" " Oölitic red ochre.
* " " Clay iron-stone.
Martite, cryst.
Ilmenite, "
Spinel, "
* " var. Ruby, 12 xls.
* " " Ceylonite.
*Gahnite, cryst.
Magnetite, cryst.
* " 3 modif. xls.
* " sand.
* " granular.
" Lodestone.
Franklinite, cryst.
Chromite.
Chrysoberyl, "
* " var. Alexandrite, twin xl.
Hausmannite, cryst.
*Braunite, "
Cassiterite, cryst.
* " var. wood-tin.
" " stream-tin.
* " rough xls. in Albite.
Rutile, red, cryst.
* " in quartz cryst.
" Nigrine, cryst.
* " " geniculated.
Octahedrite, cryst.
Brookite, cryst.
" cryst. (paramorph after Rutile).
Pyrolusite, cryst.
*Turgite.
Diaspore, cryst.
Göthite, "
Manganite, "
Limonite, botryoidal.
" var. Yellow ochre.
" " Bog ore.
" " Clay-iron-stone.
" pseudomorph after Pyrite.
*Xanthosiderite.
Bauxite.
Brucite, cryst.
Sassolite.
*Hydrotalcite.
Chalcophanite.
Psilomelane.
Wad.

VI. Oxygen Salts.

1. *Carbonates.*

Calcite, gr. scalenoh. xls.
" gr. hexagonal, "
" "nailhead" "
" "butterfly twin," xl.
" modified xls.
" var. Iceland-spar.
* " " Agentine.
* " cleavage (orange).
" coarse limestone (blue).
" var. Statuary Marble, polished.
* " " Siena Marble, polished.
" " Tennessee Marble, polished.
* " " Lithographic stone.
* " " Hydraulic limestone.
" " Chalk.
" " Oölite.
" " Stalactite.
" " Mex. Onyx, pol.
* " " Travertine.
* " " Calc-tufa.
Dolomite, cryst. "pearl spar."
" massive.
*Ankerite, cryst.
Magnesite.
Siderite, cryst.
* " xline.
Rhodochrosite, cryst.
Smithsonite.
Aragonite, gr. prism. xls.
" twin xl.
" "Flos-ferri."
Witherite, cryst.
Strontianite, xline.
Cerussite, white cryst.
" brown xline, mass.
*Barytocalcite, cryst.
*Phosgenite, "
*Malachite, cryst.
" velvety.
" banded, pol.
Azurite, cryst.
" ball of xls.
*Aurichalcite.
*Hydrozincite.
*Gay-Lussite, xls.
*Trona.
*Hydromagnesite.
Zaratite.
*Remingtonite.

2 (a). *Anhydrous Silicates.*

Petalite.
*Eudidymite, cryst.
Orthoclase, group xls.
* " "Baveno" twin xl.
" "Carlsbad" twin xl.
" cleavage.
* " Adularia, gr. xls.
" Sanadin, " "
* " Loxoclase, " "
*Perthite, xline.
*Microcline, "
" var. Amazonstone, xl.
* " " Chesterlite, xl.
Albite, cryst.
" lamellar, xline.
* " Moonstone, xline.
* " var. Pericline, cryst.
*Oligoclase, white.
" var. Sunstone.
Andesine.
Labradorite, polished.
Anorthite, cryst.
Leucite, large xl.
* " xls. in lava.
*Enstatite, altered xl.
" var. Bronzite, xline.
Hypersthene.
Pyroxene, var. Diopside, cryst.
" var. Malacolite, xl.
* " " Violan.
" " Coccolite, xline.
* " " Diallage, xline.
" " Schefferite, xl.
* " " Jeffersonite, xl.
" " Augite, xl.
* " " Fassaite, xl.
Acmite (Aegirite), cryst.
Spodumene, xline.
* " var. Hiddenite, xl.
Jadeite.
Wollastonite, cryst.
Pectolite, radiated.
Rhodonite, massive.
* " var. Paisbergite.
" " Fowlerite.
*Anthophyllite.
Amphibole, var. Tremolite, cryst.
" var. Actinolite, cryst.
" " Asbestus.
* " " Mountain Cork.
* " " Byssolite, cryst.
" " Edenite, xline.
" " Hornblende, xl.
" " " mass.
*Glaucophane.
Crocidolite.
Beryl.
" var. Emerald, cryst.
* " " Aquamarine.
*Eudialyte.
Iolite, xline.

*Iolite, var. Cordierrite, cryst.
*Ganomalite.
Nephelite.
Cancrinite.
Sodalite.
Hauynite.
*Noselite.
Lazurite (Lapis Lazuli).
*Helvite.
*Eulytite.
*Zunyite.
Garnet Grossularite, cryst.
* " Cinnamon St., cr.
" Pyrope (precious).
" Almandite, Salida, xl.
" Almandite, Alaska, cryst.
* " Spessartite, cryst.
* " Topazolite, cryst.
" Polyadelphite, cr.
* " Uvarovite, cryst.
Schorlomite.
Monticellite, cryst.
*Forsterite.
*Chrysolite, precious.
" common.
*Tephroite.
*Willemite, green mass.
" var. Troostite, xl.
Phenacite, cryst.
Dioptase, "
*Pyrosmalite, "
*Meionite, "
Wernerite, xl.
* " var. Nuttalite, cryst.
" " pink Scapolite.
*Vesuvianite, xline.
" gr. xls.
Zircon, 6 xls.
* " modif. cryst.
* " var. Hyacinth, xls.
Thorite, cryst.
Danburite, "
*Topaz, 6 yellow xls.
" 6 clear "
" massive.
* " var. Pycnite.
Andalusite, xl.
" Chiastolite, xl.
*Sillimanite, cryst.
" var. Fibrolite, xline.
Cyanite, cryst.
Datolite, "
*Gadolinite.
Zoisite, gray xline.
* " rose (Thulite).
Epidote, xls.
" mass. xline.
*Piedmontite.
Allanite.
Axinite, cryst.
Prehnite, "
Chondrodite, cryst.
*Bertrandite, "
Calamine, "
Cerite.
Tourmaline, black, cryst.
" Rubellite, "
* " Indicolite, "
" green, "
" brown, "
*Dumortierite,
*Staurolite, xls. in rock.
" 3 twin xls.

2 (b). *Hydrous Silicates.*

Apophyllite, cryst.
Heulandite, "
*Brewsterite, "
*Epistilbite, "
Phillipsite, "
Harmotome, "
Stilbite, ordinary xls.
" "wheat sheaf" xls.
* " Sphaerostilbite.
*Laumontite, cryst.
Chabazite, "
* " var. Phacolite (twin xls).
*Gmelinite, cryst.
Analcite, "
Natrolite, "
*Scolecite, "
*Mesolite, "
Thomsonite.
*Chlorastrolite.
Muscovite, xl.
" var. Damourite.
* " " Fuchsite.
Pinite (Agalmatolite).
Lepidolite, xline.
*Zinnwaldite, cryst.
Biotite, "
Phlogopite, "
Margarite, "
*Seybertite, "
*Chloritoid.
Clinochlore, cryst.
*Penninite. "
Prochlorite.
*Corundophilite.
Cronstedtite, cryst.
*Jefferisite, xl.
*Vermiculite, xl.
*Serpentine, cryst., pseudo.
* " var. Noble.
" " Common.
" " Williamsite.
* " " Marmolite.
" " Chrysotile.
* " " Baltimorite.
Deweylite.
*Genthite.
Garnierite.
*Talc, var. Foliated.
" " Soapstone, gran.
" " French Chalk.
Sepiolite (meerschaum).
Glauconite (marl).
Kaolinite.
*Halloysite.
*Cimolite.
Pyrophyllite.
*Allophane.
*Thaumasite.
*Uranophane.
Chrysocolla.
*Bementite, xline.
*Caryopilite, cryst.
Titanite, xl.
*Tscheffkinite.
Astrophyllite, cryst.
Dysanalyte, 6 xls.

3. *Niobates, Tantalates, etc.*

*Koppite.
Microlite, 2 xls.
*Fergusonite, cryst.
Columbite, "
*Tantalite.
Samarskite.
*Euxenite.

4. *Phosphates, Arsenates, etc.*

Xenotime, cryst.
*Monazite, xl.
" sand.
*Pucherite, cryst.
*Triphyllite. "
*Beryllionite, "
Apatite, xl. brown.
* " " green.
* " " transp.
* " Phosphorite.
*Hydroapatite, cryst.
Phosphate Rock.
Pyromorphite, cryst. green.
* " cryst. brown.
Mimetite, cryst.
Endlichite, group xls.
Vanadinite, gr. xls. red.
* " " " brown.
Wagnerite, cryst.
*Triplite.
Amblygonite.
Olivenite, cryst.
*Libethenite, "
Adamite, "
Descloizite, ord. red, cryst.
* " var. Cuprodescloizite.
Clinoclasite, cryst.
Dufrenite.
Lazulite, cryst.
Arseniosiderite.
*Struvite, 3 xls.
*Brandtite, cryst.
Vivianite, "

Erythrite, cryst.
Annabergite.
Scorodite, cryst.
*Strengite.
Variscite.
*Pharmacolite.
*Newberyite, cryst.
*Conichalcite, "
*Euchroite, "
Tyrolite.
Chalcophyllite.
*Ludlamite, cryst.
Wavellite, "
Turquois.
*Cacoxenite, cryst.
*Childrenite, "
*Liroconite, "
Torbernite, "
Autunite, "
*Nadorite, "
*Ecdemite, cryst.
Soda Nitre.

5. Borates, etc.

Ludwigite.
Boracite, cryst.
*Howlite.
Colemanite, cryst.
Borax, xl.
Ulexite.
Uraninite.
*Gummite.

VII. Sulphates, etc.

Thenardite, 3 xls.
Glauberite, cryst.
Barite, brown xl.
* " blue xl.
" compact massive.
* " fetid, granular.
Celestite, cryst.
" cleavage.
Anglesite, cryst.
Anhydrite.
Crocoite, cryst.
*Kainite.
Hanksite, 3 xls.
Leadhillite, cryst.
Brochantite, "
*Linarite, "
*Mirabilite.
Kieserite.
Gypsum, var. Selenite, 3 xls.
" var. Selenite, twin.
" " Selenite, cleavage.
" " Satin Spar.
* " " Alabaster.
" " Rock-plaster.
*Epsomite.
*Goslarite.
Melanterite.
Chalcanthite.
*Blödite.
Polyhalite.
*Halotrichite.
*Roemerite.
*Langite.
*Herrengrundite, cryst.
*Serpierite, cryst.
Copiapite.
*Aluminite.
Alunite, cryst.
Jarosite, "

VIII. Tungstates, etc.

Wolframite, cryst.
Scheelite, cryst.
*Stolzite, cryst.
*Wulfenite, red cryst.
" yellow cryst.

IX. Salts of Organic Acids.

Mellite.

Hydrocarbon Compounds

Ozocerite.
*Pyropissite.
Succinite.
Copalite.
*Tasmanite.
*Idrialite.
*Petroleum.
Asphaltum.
Elaterite.
*Albertite.
Anthracite Coal.
Bituminous Coal.
*Lignite.
Cannel Coal.
*Brown Coal.

New Species.

Boleite, 3 xls.
*Cumengéite, 3 xls.
*Lawsonite, cryst.
*Northupite, xl.

Elementary.

The following are all accurately labeled with printed label, giving name, chemical composition, crystallization and locality, as shown in Plate IX. The specimens are in every way as good—in fact, are exact duplicates of those in the more expensive advanced collections. (Collections illustrating various elementary text-books on Mineralogy and Geology are given in Division "C," beyond.)

No. 13. Academy or High School Collection. 180 specimens, averaging 4¾x3½ in., $100. Handsome glass cases, $47 extra. See Plate VIII.

Prepared especially to meet the demand among Normal and High Schools and private Academies, for a showy collection, embracing only the common species, or those which are most essential in a short course. (List follows No. 17.) The striking colors and choice crystallizations, in

which the collection abounds, make it when properly cased, a most attractive and valuable ornament for the class-room or school museum.

No. 14. Academy or High School Collection. 180 specimens, averaging 3½x2¾ in., $50. Quartered oak drawer cabinet with pasteboard trays, $11.75 extra. Glass cases, $36 extra.

Fully as good as the preceding in every respect, except that the specimens are smaller. This is a decided improvement over the collection formerly sold by us under this name and at the same price. The elimination of rare species and substituting of important varieties of common species adds greatly to its usefulness. (See descriptive list following No. 17.) With a larger stock to draw from in perfecting this collection and bringing it up date, we believe that even greater approval will be won for it than in the past.

No. 15. Students' Collection. 180 specimens, averaging 2½x2 in., $25. Drawer cabinet with pasteboard trays, $8.75 extra. Weighing when packed with cabinet about 125 pounds.

An excellent collection for amateur or student; arranged according to the ACADEMY LIST.

No. 16. Students' Collection. 180 specimens, averaging 1¼x1¼ in., $10. Polished quartered oak compartment cabinet, $2.40 extra. Weighing when packed with cabinet about 33 pounds; arranged according to the ACADEMY LIST.

No. 17. 180 Fragments, $6.60. Including quartered oak compartment cabinet. Weighing when packed in two packages about 7½ pounds.

Fragments have numbers attached to correspond to following list of names:

ACADEMY COLLECTION LIST.

Describing collections catalogued Nos. 13 to 17, inclusive. Nos. 18 to 22 are selected from this list, with occasional variations. (In the *Complete Mineral Catalogue* will be found a numerical list, according to Dana's *System of Mineralogy*, 6th ed., 1892, which gives the name, crystallization and chemical composition in words and symbols of all known mineral species, as well as the names of all varieties. A supplement compiled from recent scientific literature completes the list to date.)

Carbon.

1. **Diamond.** An octahedral crystal showing rounded edges and curved faces, with the triangular pittings characteristic in rough diamonds. From the famous

KIMBERLY MINES, SOUTH AFRICA.

2. **Graphite.** *Black Lead or Plumbago.* A piece of the variety occurring in compactly foliated masses.

CEYLON.

Sulphur.

3. **Native Sulphur.** A brilliant yellow group of orthorhombic crystals. This species is noted for the magnificent crystallizations occurring in the historic and extensive Sicilian beds.

CIANCIANA, SICILY.

Arsenic.

(See also No. 42, Arsenopyrite.)

4. **Orpiment.** A crystallized specimen exhibiting the characteristic yellow color.
MERCUR, UTAH.

Antimony.

5. **Native Antimony.** A bright crystalline specimen of the pure metal as it occurs in a recently discovered deposit
NEAR SOUTH RIVERSIDE, CALIFORNIA.

6. **Stibnite.** A crystalline mass, showing the yellow alteration to antimony oxide.
ZAIATCHA, PODRINE, SERVIA.

Bismuth.

7. **Native Bismuth.** A specimen showing disseminated through it bright plates of the pure metal.
SCHNEEBERG, SAXONY.

Molybdenum.

8. **Molybdenite.** A large metallic looking crystal in Pyroxene.
ALDFIELD, QUEBEC, CANADA.

Gold.

9. **Native Gold,** disseminated in small grains through Quartz.
CALIFORNIA.

Platinum.

10. **Native Platinum** in small scales or grains as it is washed from auriferous sands.
URAL MOUNTAINS, SIBERIA.

Silver.

11. **Native Silver.** A specimen from
ONTONAGON CO., MICHIGAN.

12. **Argentite.** *Silver Glance.* A crystallized example of this rich ore.
GUANAJUATO, MEXICO.

13. **Pyrargyrite,** *Antimonial "Ruby Silver,"* from
AUSTIN, NEVADA.

14. **Cerargyrite.** A good example of the sectile ore, known as *"Horn Silver."*
SILVER CITY, NEW MEXICO.

15. **Stephanite.** *Brittle Silver.* Small crystals and rich massive ore illustrated in one piece.
LAKE CHELAN DISTRICT, MOORE CO., MONTANA.

Mercury.

16. **Cinnabar.** The principal ore of quicksilver.
NEW ALMADEN MINES, CALIFORNIA.

Copper.

17. **Native Copper.** A crystalline mass of pure copper from the famous Lake Superior copper region.
HOUGHTON CO., MICHIGAN.

18. **Chalcocite.** *Copper Glance.* A massive piece from the great Anaconda Mines at
BUTTE, MONTANA.

19. **Bornite.** *Peacock Copper.* The handsome purple iridescence of this mineral is well illustrated.
UNION BRIDGE, CARROLL CO., MARYLAND.

20. **Chalcopyrite.** *Copper Pyrites.* A pretty specimen showing the rich brass yellow crystals thickly scattered through white Calcite. (See also No. 97.)
FRENCH CREEK MINES, PENNSYLVANIA.

21. **Tetrahedrite.** *Gray Copper or Fahlerz.* A piece of the argentiferous ore as occurring at the

BROKEN HILL MINES, NEW SOUTH WALES.

22. **Cuprite.** The typical massive variety as mined in

ONTONAGON CO., MICHIGAN.

23. **Malachite.** *Green Carbonate.* A beautiful bright green specimen with a delicate velvety surface.

COPPER QUEEN MINE, COCHISE CO., ARIZONA.

24. **Azurite.** Limonite covered with brilliant gem-like crystals of the "*blue carbonate.*" This mine has produced the finest crystallizations of this mineral ever found.

COPPER QUEEN MINE, COCHISE CO., ARIZONA.

25. **Chrysocolla** in Quartz rock.

SHANNONVILLE MINES, MONTGOMERY CO., PENNA.

26. **Brochantite.** Rich green crystallization from

FRISCO, BEAVER CO., UTAH.

Lead.

27. **Galena.** *Galenite.* A good example of the principal lead ore, in bright cubic crystallization.

JOPLIN, JASPER CO., MISSOURI.

28. **Pyromorphite.** Typical green hexagonal crystals scattered over Quartz.

WHEATLEY MINES, NEAR PHŒNIXVILLE, PENNA.

29. **Mimetite.** *Campylite.* A rare mineral.

ROUGHTEN GILL, CUMBERLAND, ENGLAND.

30. **Vanadinite.** One of the most beautiful minerals in lustre and in the clear-cut quality of the crystals. An example of the red variety, highly prized by collectors.

YUMA CO., ARIZONA.

31. **Wulfenite.** A good group of yellow crystals from the

ORGAN MOUNTAINS, NEW MEXICO.

32. **Cerussite.** A representative of this common ore as mined at

BROKEN HILL, NEW SOUTH WALES.

33. **Anglesite.** Another of the numerous lead minerals noted for their adamantine lustre and perfect crystallization. A choice crystal on granular galena from the

LEAD MINES AT MONTE PONI, SARDINIA.

Tin.

(See also No. 55.)

34. **Cassiterite.** Large irregular crystals scattered through Albite. From the well-known Black Hills Tin District.

MARGARET MINES, PENNINGTON CO., SOUTH DAKOTA.

Titanium.

35. **Rutile.** The variety called "*nigrine,*" owing its black color to a small percentage of iron. This specimen shows the complex tetragonal twinning common to the species.

MAGNET COVE, ARKANSAS.

36. **Brookite.** A rarer mineral, having the same composition as Rutile, and occurring with the latter in fine orthorhombic crystallizations at

MAGNET COVE, ARKANSAS.

Iron.

37. **Pyrrhotite.** *Magnetic or Niccoliferous Pyrites.* Commonly occurring massive and often mined as an ore of nickel. A bronze-colored specimen from

SOUTH STRAFFORD, VERMONT.

38. **Pyrite.** *Iron Pyrites,* sometimes called "*Fool's Gold.*" A very common mineral, occurring in various bright and showy forms. One of the most common is the pyritohedron, illustrated in this crystal.

ISLAND OF ELBA.

39. **Pyrite** *var. Massive.* A sample of the ore mined at
RIO TINTO, SPAIN.

40. **Marcasite,** "*Cockscomb Pyrites.*" A group of crystals as found with zinc and lead ores of
JOPLIN, MISSOURI.

41. **Marcasite** *var. Radiated.* A crystalline disk showing the odd and interesting form which the mineral sometimes assumes. Occurring in unusually symmetrical specimens in the coal measures near
SPARTA, ILLINOIS.

42. **Arsenopyrite.** *Arsenical Pyrites or Mispickel.* A typical specimen from
ACTON, MAINE.

43. **Hematite.** *Specular Iron.* A beautiful group of these dazzling coal-black crystals as found in the historic iron mines on the
ISLAND OF ELBA.

44. **Hematite.** *Massive Specular Ore.* Mined throughout the Lake Superior iron region.
ST. LOUIS CO., MINNESOTA.

45. **Hematite** *var. Red Ochre.* The massive "oölitic" kind.
CLINTON, NEW YORK.

46. **Magnetite.** Two detached crystals showing a common modified octahedron, and a rather puzzling distorted octahedron. Like Hematite, it is a very important ore of iron.
ESSEX CO., NEW YORK.

47. **Magnetite** *var. Lodestone.* A good piece of this variety possessing strong polarity, sometimes known as "Natural Magnet."
MAGNET COVE, ARKANSAS.

48. **Franklinite.** A good crystallized specimen of this species, known to occur only at one locality, where it is mined extensively as an ore of zinc.
FRANKLIN FURNACE, NEW JERSEY.

49. **Chromite.** *Chromic Iron.* The usual massive form.
TEXAS, LANCASTER CO., PENNSYLVANIA.

50. **Limonite.** Another common iron ore, often occurring with bright botryoidal surfaces. This specimen exhibits a splendid iridescence not unusual to the species.
IRON MOUNTAIN, CUSTER CO., SOUTH DAKOTA.

51. **Limonite.** *Yellow Ochre.* The variety used in making paints, etc.
LITTLESTOWN, PENNSYLVANIA.

52. **Limonite.** *Pseudomorph after Pyrite.* This common alteration of Pyrite is illustrated in a group of octahedral crystals.
JARILLA MOUNTAINS, NEW MEXICO.

53. **Siderite.** A crystallized specimen, showing the perfect brown rhombs in pretty contrast to the white background of Cryolite.
IVIGTUT, GREENLAND.

54. **Columbite.** A crystallized specimen occurring as an association of tin ore. Contains the rare Niobic and Tantalic acids.
PENNINGTON CO., SOUTH DAKOTA.

55. **Wolframite.** Specimen showing the crystalline mineral associated with the rare Stannite (Tin Sulphide).
NEAR REDRUTH, CORNWALL, ENGLAND.

Nickel.

56. **Millerite.** A fibrous crust composed of slender hair-like crystals on niccoliferous pyrites (Pyrrohotite).
GAP MINE, LANCASTER CO., PENNA.

57. **Niccolite.** A bright mass exhibiting the metallic nature of this ore.
BEBRA, HESSE, GERMANY.

58. **Garnierite.** A green amorphous ore.
DOUGLAS CO., OREGON.

Cobalt.

59. **Cobaltite.** Three perfect isometric crystals, showing the different habits assumed.
ENGGRUFVORNA, SWEDEN.

Manganese.

60. Pyrolusite. Bright needle-like crystallizations of this common ore.
TENNY CAPE, HANTS CO., NOVA SCOTIA.

61. Rhodonite. A pretty crystallized specimen of the variety called "*Fowlerite*," mined at
FRANKLIN FURNACE, NEW JERSEY.

62. Rhodochrosite. Specimen showing the delicate pink color in combination with Iron Pyrites.
ALICANTE, LAKE CO., COLORADO.

Zinc.

63. Sphalerite. *Zinc Blende.* A fine group of typical dark crystals as mined at
JOPLIN, JASPER CO., MISSOURI.

64. Zincite. A deep red mineral, rarely crystallized, extensively mined as an ore at this famous locality, but comparatively unknown elsewhere.
FRANKLIN FURNACE, NEW JERSEY.

65. Willemite. A large hexagonal crystal in Calcite, of the variety called *Troostite.*
FRANKLIN FURNACE, NEW JERSEY.

66. Calamine. A crystallized specimen.
FRIEDENSVILLE, PENNSYLVANIA.

67. Smithsonite. A specimen of a delicate green tint, showing the characteristic rounded surfaces. KELLY, NEW MEXICO.

Aluminium.

68. Corundum. A gray cleavage specimen banded with the deep blue of *Sapphire.*
TALLAPOOSA CO., ALABAMA.

69. Corundum *var. Emery.* The typical granular massive form.
MINES NEAR NAXOS, ASIA MINOR.

70. Bauxite. A sample of the massive concretionary variety mined in
FLOYD CO., GEORGIA.

71. Spinel. Octahedral crystals in Calcite.
SUSSEX CO., NEW JERSEY.

72. Cryolite, or "*Ice Stone.*" A mineral long mined at this locality, but elsewhere quite rare. Used in the manufacture of sodium salts and aluminium.
IVIGTUT, GREENLAND.

73. Wavellite. Beautiful green radiations in stellated form.
MONTGOMERY CO., ARKANSAS.

74. Kaolin. An important mineral used in the manufacture of porcelain, etc.
DIXON'S QUARRY, NEWCASTLE CO., DELAWARE.

75. Turquois. A good illustration of the occurrence of this beautiful gem in the natural form.
JARILLA MOUNTAINS, NEW MEXICO.

76. Alunite. *Alum Stone.* Mined at
MUZAI, HUNGARY.

Calcium.

77. Fluorite. Group of clear purple to amethystine crystals. A mineral well known among collectors for the splendid and many-colored crystallizations, in which it occurs at various localities.
CUMBERLAND, ENGLAND.

78. Fluorite *var. Massive.* White in color and cleavable.
ROSICLAIRE, ILLINOIS.

79. Calcite *var. Dog-tooth Spar.* A common form found in particularly showy specimens at the zinc mines about
JOPLIN, JASPER CO., MISSOURI.

80. Calcite, *clear hexagonal prisms.* A choice group of perfect and very brilliant crystals.
FRIZINGTON, CUMBERLAND, ENGLAND.

81. Calcite *var. Iceland Spar.* An attractive specimen exhibiting nicely the phenomenon of double refraction.
JOPLIN, JASPER CO., MISSOURI.

82. Calcite *var. Statuary Marble.* White, fine grained quality.
RUTLAND, VERMONT.

83. **Calcite** *var. Chalk.* A white compact piece.
DOVER CLIFFS, ENGLAND.

84. **Calcite** *var. Stalactite.* A pretty example of this curious formation, having a delicate sea-green tint due to the presence of copper. From a cave in the
COPPER QUEEN MINE, ARIZONA.

85. **Calcite** *var. Mexican Onyx.* A polished section with vari-colored bands.
TECALI, PUEBLA, MEXICO.

86. **Calcite** *var. Calc. Tufa, or "Petrified Moss."* Specimen showing impressions of moss and stems.
OSWEGO, NEW YORK.

87. **Aragonite.** A perfect six-sided prism, or twin-form of the orthorhombic system, called "pseudo-hexagonal." Detached crystal from
BASTENNES, FRANCE.

88. **Aragonite** *var. Flos Ferri.* A kind noted for the beauty and variety of the coralloidal forms it assumes.
ORGAN MOUNTAINS, NEW MEXICO.

89. **Apatite.** A symmetrical and clear-cut crystal of hexagonal form, reddish brown in color.
NEAR EGANVILLE, RENFREW CO., ONTARIO, CANADA.

90. **Anhydrite.** An example of the commonest type—compact massive.
ALBERT CO., NEW BRUNSWICK.

91. **Gypsum** *var. Selenite.* Three clear monoclinic crystals, as perfectly symmetrical as glass models.
MAHONING CO., OHIO.

92. **Gypsum** *var. Selenite.* A mineral so perfect in transparency that it finds special application in optical work. A fine cleavage piece.
WAYNE CO., UTAH.

93. **Gypsum** *var. Satin Spar.* A characteristic and pretty example from
DERBYSHIRE, ENGLAND.

94. **Gypsum** *var. Rock Plaster.* A massive variety commonly employed in making plaster of paris.
GRAND RAPIDS, MICHIGAN.

95. **Brucite.** A crystallized specimen showing good cleavage. A rare mineral.
TEXAS, LANCASTER CO., PENNSYLVANIA.

96. **Magnesite.** A white compact piece from the mines on the
ISLAND OF NEGROPONTI, GREECE.

97. **Dolomite.** *Pearl Spar.* A showy specimen made up of the peculiar saddle-shaped rhombohedrons characteristic of this mineral. Scattered over these are small but symmetrical tetrahedrons of Chalcopyrite.
JOPLIN, JASPER CO., MISSOURI.

98. **Dolomite** *var. Magnesian Marble.* A granular crystalline kind, from
SING SING, NEW YORK.

Barium.

99. **Barite.** *Heavy Spar.* A specimen of the common form—compact crystalline, with a somewhat lamellar structure. Much resembling the preceding, but distinguished by its relatively high density.
CHESHIRE, CONNECTICUT.

100. **Witherite.** A crystalline specimen.
FALLOWFIELD, NORTHUMBERLAND, ENGLAND.

Strontium.

101. **Celestite.** A transparent pale-blue specimen, showing perfect cleavage—a common type.
STRONTIAN ISLAND, LAKE ERIE.

102. **Strontianite.** Columnar, massive in structure.
DREISTEINFURT, WESTPHALIA.

Sodium and Potassium.

103. **Halite.** *Rock Salt.* A colorless and marvellously clear cubic cleavage. Its perfect transparency and property of transmitting light equally in all directions, gains for it a limited application in optical work.
SAN BERNARDINO CO., CALIFORNIA.

104. Colemanite. A very beautiful group of clear crystals, with adamantine lustre. From the borax mines in
San Benardino Co., California.

105. Borax. A symmetrical and perfect crystal of this well-known compound.
Esmeralda Co., Nevada.

106. Sylvite. A sample of this potassium salt mined on a large scale at
Stassfurt, Germany.

Oxides of Silicon.

107. Quartz *var. Rock Crystal.* A handsome group of the large clear crystals found in abundance for many years in the "Crystal Mountains,"
Near Hot Springs, Arkansas.

108. Quartz *var. Amethyst.* A group of the purple crystals from the silver mines of
Guanajuato, Mexico.

109. Quartz *var. Rose.* A choice translucent piece of this variety of Quartz, showing good color.
Custer, South Dakota.

110. Quartz *var. Smoky. Cairngorm Stone* or "*Smoky Topaz*," as it is sometimes styled. A crystal from
Pike's Peak, Colorado.

111. Quartz *var. Milky.* An opaque, massive specimen.
Montgomery Co., Pennsylvania.

112. Quartz *var. Chalcedony.* A fine translucent piece, showing the characteristic waxy lustre and mamillary surface.
Tampa Bay, Florida.

113. Quartz *var. Blood Stone*, or "Heliotrope." A very pretty polished specimen.
South Park, Colorado.

114. Quartz *var. Banded Agate.* A beautiful polished piece of this familiar form of Silica, showing the successive layers or deposits, in various colors.
Brazil.

115. Quartz *var. Moss Agate.* A specimen of choice quality imitative of moss or tree growth, similar to that found at many other localities.
Laramie Co., Wyoming.

116. Quartz *var. Flint.* A nodule showing sharp fracture, and on the rounded surface, traces of Chalk. From the chalk cliffs at
Dover, England.

117. Quartz *var. Jasper.* A piece of the red variety.
Near Ottawa, Canada.

118. Quartz *var. Italcolumyte, or Flexible Sandstone.* A slab of this strange mineral, illustrating its flexible quality well.
Rutherford Co., North Carolina.

119. Quartz *var. Jasperized Wood.* A choice specimen of this exquisitely colored ornamental stone. From the famous "Chalcedony Park" or
Petrified Forest, near Holbrook, Arizona.

120. Quartz *var. Tiger-Eye.* (An altered Crocidolite, or "Quartz pseudomorph after Crocidolite.") A polished piece, possessing to a remarkable degree the chatoyant lustre which has made the material so popular as a fancy stone for paperweights, etc.
Griqualand, South Africa.

121. Opal *var. Precious.* Showing the delicate play of colors characteristic of this highly-prized and popular gem.
Queretaro, Mexico.

122. Opal *var. Fire.* The red tints of the internal reflections suggest the name.
Queretaro, Mexico.

123. Opal *var. Green-opal.* Regarded as the handsomest example of the various colors in which *Common Opal* occurs. A mottling of red through the translucent green, adds to the beauty of this specimen.
Waterville, Douglas Co., Washington.

124. Opal *var. Opalized Wood.* A section of a branch of this wonderful petrifaction, reproducing in the most minute detail the cells, fibre, rings of growth, and irregularities of wood structure. In this respect it is by far the finest example of wood petrifaction known. It possesses a high natural polish and is of a rich yellow-brown color. Recently discovered near
Clover Creek, Lincoln Co., Idaho.

125. Opal *var. Tripoli. Infusorial Earth.* The kind called "*Electro-Silicon*," used for polishing purposes.

NEAR VIRGINIA CITY, NEVADA.

Silicates.

(*a*) *The Feldspars.*

126. Orthoclase. *Common Feldspar.* A group of large and well-defined crystals of the common habit.

PIKE'S PEAK, COLORADO.

127. Orthoclase. *Carlsbad Twin.* A neat crystal of this common type of twinning.

PUY-DE-DOME, FRANCE.

128. Orthoclase. *Common Feldspar.* A piece showing the perfect cleavage common in this species.

ELAIN, DELAWARE CO., PENNSYLVANIA.

129. Microcline *var. Amazon Stone.* A green triclinic feldspar well known among collectors for the superb crystals found at this locality. A choice crystal.

PIKE'S PEAK, COLORADO.

130. Albite. A cleavable lamellar white variety, known as *Clevelandite*, showing the faint striations characteristic of the triclinic feldspars.

AUBURN, MAINE.

131. Oligoclase *var. Sunstone*, or "Adventurine Feldspar." A pretty cleavage piece, spangled with golden scales, giving fire-like reflections when turned in the light. (Due to included crystals.)

TVEDESTRAND, NORWAY.

132. Labradorite. A polished piece of this most beautiful and interesting mineral. The play of colors in varied shades of red, green and blue give a charming effect.

LABRADOR.

133. Enstatite *var. Bronzite.* A crystalline specimen.

WEBSTER, JACKSON CO., NORTH CAROLINA.

(*b*) *Pyroxene, Amphibole, etc.*

134. Pyroxene. A crystal nicely illustrating the common habit.

NEAR EGANVILLE, RENFREW CO., ONTARIO, CANADA.

135. Pyroxene *var. Malacolite.* A complete crystal of symmetrical and regular outline.

SING SING, NEW YORK.

136. Pyroxene *var. Coccolite.* A green variety made up of crystalline grains in white limestone.

OXBOW, JEFFERSON CO., NEW YORK.

137. Spodumene. A crystalline specimen.

CHESTERFIELD, MASSACHUSETTS.

138. Wollastonite. *Tabular Spar.* Monoclinic crystals in Calcite.

DIANA, LEWIS CO., NEW YORK.

139. Amphibole *var. Tremolite.* In slender crystals of pale gray color.

GOVERNEUR, NEW YORK.

140. Amphibole *var. Actinolite.* A typical example of the green Amphibole. The radiated bladed or fibrous structure is nicely shown.

HUNTINGTON, MASSACHUSETTS.

141. Amphibole *var. Asbestus.* Used for fire-proof cloth, etc. (See No. 169.)

NEAR MEDIA, DELAWARE CO., PENNSYLVANIA.

142. Amphibole *var. Common Hornblende.* A crystal of simple monoclinic form from

NEAR EGANVILLE, RENFREW CO., ONTARIO, CANADA.

143. Beryl. A common variety of an opaque pale green color.

ACKWORTH, NEW HAMPSHIRE.

144. Beryl *var. Emerald.* A crystal of this valuable gem mineral in a feldspar matrix. The rich emerald green makes a pretty contrast with the white rock.

BIG CRABTREE MT., MITCHELL CO., NORTH CAROLINA.

145. Garnet *var. Grossularite.* A group of pale yellow crystals, showing the dodecahedron modified by the trapezohedron.

WAKEFIELD, QUEBEC, CANADA.

146. **Garnet** *var. Pyrope.* (*Precious Garnet.*) A number of clear, deep red pebbles of gem quality.

COLORADO RIVER, ARIZONA.

147. **Garnet** *var. Almandite.* A large and remarkably symmetrical crystal, showing on a broken corner the red color common in Garnet. Traces of the Chlorite, in which the crystals are found, give them a greenish tinge.

SALIDA, COLORADO.

(c) *The Micas.*

148. **Muscovite.** *Potash Mica.* A flat hexagonal crystal of this common and important form of Mica.

JACKSON CO., NORTH CAROLINA.

149. **Biotite.** *Magnesia-Iron Mica.* A black variety.

RENFREW CO., ONTARIO, CANADA.

150. **Phlogopite.** A kind of Biotite, generally of bronze color. If a thin sheet be held before the eye and a distant light be viewed through it, a six-rayed star appears plainly. This odd and interesting phenomenon of "asterism" is peculiar to this variety of mica.

BURGESS, ONTARIO, CANADA.

151. **Lepidolite.** *Lithia Mica.* A pretty lilac colored piece of scaly-granular structure.

NORWAY, MAINE.

(d) *Tourmaline, Serpentine, etc.*

152. **Clinochlore.** One of the commonest of the hydromicas or Chlorite group. A mica-like sheet cleaved from a large green crystal.

BRINTON'S QUARRY, CHESTER CO., PENNSYLVANIA.

153. **Chrysolite.** *Olivine.* An olive green specimen of the usual form; granular massive.

WEBSTER, JACKSON CO., NORTH CAROLINA.

154. **Zircon.** Several symmetrical and perfect crystals, illustrating the tetragonal prism and pyramid. Selected from the Zircon Sand washed from the

GREEN RIVER, HENDERSON CO., NORTH CAROLINA.

155. **Wernerite.** *Scapolite.* A crystalline specimen.

BOLTON, MASSACHUSETTS.

156. **Vesuvianite.** A piece of the usual brown color, showing the columnar to radiated structure.

WOODSTOCK, MAINE.

157. **Epidote.** A crystallized specimen of the peculiar pistachio green shade, common to the mineral.

NAHANT, MASSACHUSETTS.

158. **Zoisite.** The usual gray massive type.

CONWAY, MASSACHUSETTS.

159. **Tourmaline,** *Black.* A piece of Quartz penetrated by the shiny columnar crystals.

FORAN GOLD MINE, CUSTER CO., SOUTH DAKOTA.

160. **Tourmaline,** (*Red*) *var. Rubellite.* Showing one of the most exquisite tints of this pretty gem stone. The pink crystals with the lilac background of the Lepidolite matrix, make a very attractive specimen. A cross-section as shown on a broken crystal appears to be a rounded triangle, characteristic of the Tourmaline form.

PALA, SAN DIEGO CO., CALIFORNIA.

161. **Topaz.** Noted for its great brilliancy and clearness when cut—qualities which are also well illustrated in its natural crystallizations. Three limpid and beautifully terminated crystals of slightly different forms.

THOMAS MOUNTAIN, MILLARD CO., UTAH.

162. **Titanite.** *Sphene.* A dark-brown crystal of monoclinic form.

RENFREW CO., ONTARIO, CANADA.

163. **Andalusite** *var. Chiastolite.* The polished section of a crystal of this variety shows a dark cross, due to the presence of regularly arranged carbonaceous inclusions.

LANCASTER, MASSACHUSETTS.

164. Cyanite. A fine blue specimen formed of thin, bladed crystals, packed closely together.

CHEROKEE CO., ALABAMA.

165. Pyrophyllite. A pearly foliated mass, showing the usual radiated structure.

GUILFORD CO., NORTH CAROLINA.

166. Staurolite. "*Cross Stone.*" A perfect crystal, showing the odd and pretty habit of twining common to this species.

FANNIN CO., GEORGIA.

167. Talc. *Steatite or Soapstone.* A specimen illustrating the somewhat foliated structure characteristic of the species.

LAFAYETTE, MONTGOMERY CO., PENNSYLVANIA.

168. Serpentine *var. Williamsite.* A beautiful translucent green kind belonging to the class of "*Precious Serpentines.*"

TEXAS, LANCASTER CO., PENNSYLVANIA.

169. Serpentine *var. Chrysotile.* The principal "*Asbestus*" of commerce. The solid masses of parallel fibres are green in color, with a silky lustre, separating easily into very light and fine threads. (The true Amphibole Asbestus is generally coarser and white, or nearly so.)

EAST TEMPLETON, QUEBEC, CANADA.

170. Datolite. A group of clear glassy crystals, with faint greenish tinge, showing the complex and highly modified form.

BERGEN HILL, NEW JERSEY.

171. Prehnite. A very pretty green specimen.

GUTTENBERG, NEW JERSEY.

172. Apophyllite. Crystals exhibiting the simple tetragonal prism and pyramid, with basal plane.

PATERSON, NEW JERSEY.

173. Pectolite. A characteristic example of the radiated structure; composed of fine sharp needles, the form in which the mineral is commonly found.

BERGEN HILL, NEW JERSEY,

(*e*) *The Zeolites.*

174. Natrolite. Slender square prisms on the matrix. Called "*Needle Zeolite*" because often found in bunches of very long and slender crystals.

BERGEN HILL, NEW JERSEY.

175. Analcite. Glassy crystals of sharp and well-defined trapezohedral form, on matrix.

TWO ISLANDS, NOVA SCOTIA.

176. Chabazite. A group of white rhombohedrons, having nearly the angles of a cube. The common type.

GABLE STATION, COLUMBIA RIVER, OREGON.

177. Stilbite. The familiar form of crystals, grouped on matrix.

GABLE STATION, COLUMBIA RIVER, OREGON.

178. Heulandite. Well-formed monoclinic crystals exhibiting the high pearly lustre, characteristic of this species.

PATERSON, NEW JERSEY.

Hydrocarbons.

179. Copalite. *Fossil Copal or "Zanzibar Gum."* A fair type of the many fossil resins classed as "Ambers," all closely related to the true Amber (Succinite). This clear yellow specimen shows an insect caught in the liquid resin.

ZANZIBAR, AFRICA.

180. Bituminous Coal. An example of one of the various kinds of Mineral Coal. A very pretty iridescent specimen.

FROSTBURG, MARYLAND.

No. 18. School Collection. 120 specimens, averaging 4¾ x 3½ in., $60. Glass cases, $36 extra.

Simply an abridgment of Academy collection No. 14; arranged for schools desiring to cut down the specimens to the minimum number re-

quired in a brief course. Except in point of size, it presents the same attractive and showy appearance as the foregoing, and forms an excellent nucleus, about which may be conveniently gathered other important minerals. The list, which follows No. 22, is exactly as recommended by Prof. E. S. Dana in the appendix of *Minerals and How to Study Them*, 1895. Although the collection is arranged to accompany this admirable and highly popular little book, it answers the requirements of other elementary works. (A brief description of the specimens is given in the preceding ACADEMY LIST.)

No. 19. School Collection. 120 specimens, averaging 3½x 2¾ in., $30. Quartered oak drawer cabinet and pasteboard trays, $8.75 extra.

Identical with No. 18, except that the specimens are smaller.

No. 20. Pupil's Collection. 120 specimens, averaging 2½x2 in., $15. Drawer cabinet with pasteboard trays, $6.75 extra. Weighing when packed with cabinet about 90 pounds.

Put up in nice typical specimens of students' size, according to SCHOOL LIST following No. 22.

No. 21. Pupil's Collection. 120 specimens, averaging 1¼x1¼ in., $6. Quartered oak compartment cabinet, $1.60 extra. Weighing when packed with cabinet about 19 pounds.

According to the SCHOOL LIST, but with a smaller proportion of perfect crystallizations than the larger sizes.

No. 22. 120 Fragments, $3.80. Including quartered oak compartment cabinet. Weighing when packed in two packages about 5 pounds.

Numbered to correspond to the following list.

SCHOOL COLLECTION LIST, 120 SPECIMENS.

Carbon.
1. Graphite.

Sulphur.
2. Sulphur, native.

Arsenic.
3. Orpiment.

Antimony.
4. Stibnite.

Molybdenum.
5. Molybdenite.

Gold.
6. Gold, native.

Silver.
7. Silver, native.
8. Cerargyrite.

Mercury.
9. Cinnabar.

Copper.
10. Copper, native.
11. Chalcocite.
12. Bornite.
13. Chalcopyrite.
14. Tetrahedrite.
15. Cuprite.
16. Malachite.
17. Azurite.

Lead.
18. Galena.
19. Pyromorphite.
20. Mimetite.
21. Vanadinite.
22. Cerussite.
23. Anglesite.
24. Wulfenite.

Tin.
25. Cassiterite.

Titanium.
26. Rutile.

Iron.
27. Pyrrhotite.
28. Pyrite.
29. Marcasite.
30. Arsenopyrite.
31. Hematite.
32. Magnetite.
33. Franklinite.
34. Chromite.
35. Limonite.
36. Siderite.
37. Columbite.

Nickel.
38. Millerite.
39. Niccolite.
40. Garnierite.

Manganese.
41. Pyrolusite.
42. Rhodonite.
43. Rhodochrosite.

Zinc.
44. Sphalerite.
45. Zincite.
46. Willemite.
47. Calamine.
48. Smithsonite.

Aluminium.
49. Corundum.
50. Spinel.
51. Cryolite.
52. Wavellite.

Calcium.
53. Fluorite.
54. Calcite, Dog-tooth Spar.
55. " Iceland Spar.
56. " Marble.
57. " Stalactite.
58. " Mexican Onyx.
59. " Calc Tufa.
60. Aragonite.

61. Apatite.
62. Anhydrite.
63. Gypsum.

Magnesium.

64. Brucite.
65. Dolomite.

Barium.

66. Barite.
67. Witherite.

Strontium.

68. Celestite.
69. Strontianite.

Sodium.

70. Halite.

Silicon.

71. Quartz, Rock Crystal.
72. " Smoky.
73. " Amethyst.
74. " Rose.
75. " Agate.
76. " Moss Agate.
77. " Jasper.
78. Quartz, Flint.
79. " Jasperized Wood.
80. Opal.

Silicates.

81. Orthoclase.
82. Albite.
83. Oligoclase.
84. Labradorite.
85. Pyroxene.
86. " Coccolite.
87. Spodumene.
88. Amphibole.
89. " Actinolite.
90. " Asbestus.
91. " Hornblende.
92. Beryl.
93. Garnet.
94. Muscovite.
95. Biotite.
96. Lepidolite.
97. Clinochlore.
98. Chrysolite.
99. Zircon.
100. Scapolite.
101. Vesuvianite.
102. Epidote.
103. Zoisite.
104. Tourmaline.
105. Topaz.
106. Titanite.
107. Andalusite.
108. Cyanite.
109. Staurolite.
110. Talc.
111. Serpentine.
112. Datolite.
113. Prehnite.
114. Apophyllite.
115. Pectolite.
116. Natrolite.
117. Analcite.
118. Chabazite.
119. Stilbite.
120. Heulandite.

For kindergarten and other inexpensive children's collections, see division "C," beyond.

B. ECONOMIC; INCLUDING SERIES OF ORES FOR MINERS, PROSPECTORS AND ENGINEERS.

The Metallic Classification of minerals, given at the end of our *Complete Mineral Catalogue*, forms a complete table from which are compiled all our lists of ores, illustrating the metallic constituents of minerals. Under the various metals are sub-headings, following which are the different minerals arranged in order of the per cent. of metal contained. It is of the greatest service to all desiring to consult a complete table of this character.

The specimens in these series are selected solely with the view of obtaining typical representatives of the kinds most commonly met with in the field, and are therefore thoroughly practical and useful. Two sizes are quoted in most cases, the smaller being equal to the larger, except for occasional differences of crystallization.

They are all labeled as shown in Plate IX, with printed label, giving name, composition and locality. For the size, 1¼x1¼ in., the compartment cabinets are recommended. (See VII, Supplies.)

Nos. 23 and 24 are kept in stock, prepared for shipment immediately on receipt of order; the others require a few days for special preparation. Lists of the various collections may be had on application.

No. 23. Prospectors' Collection. 120 specimens, averaging 2½x2 in., $16. Quartered oak drawer cabinet, with pasteboard trays, $6.75 extra. Weighs when packed with cabinet about 90 pounds.

Put up to accompany Osborn's *Prospectors' Field Book and Guide*, third ed., but is adapted to other practical works of the same character. List follows No. 24. This brief collection is intended for those wishing to become acquainted with only the most important economic minerals. Many of the specimens show characteristic crystallization, a very important consideration in seeking to recognize minerals in the varied forms in which they occur.

No. 24. Prospectors' Collection. 120 specimens, averaging 1½x1½ in., $7. Quartered oak compartment cabinet, $1.60 extra. Weighs when packed with cabinet about 19 pounds.

A convenient working collection, but necessarily composed of specimens of less perfect crystallization than the preceding.

LIST OF PROSPECTOR'S COLLECTION.

Gold.

1. Gold in quartz.
2. Gold ore, pyritiferous.

Silver.

3. Native silver, wire.
4. " " in quartz.
5. Argentite, glance.
6. Stephanite, brittle silver.
7. Cerargyrite, horn silver.
8. Pyrargyrite, ruby silver.

Copper.

9. Copper, native.
10. Cuprite, red oxide.
11. Chalcocite, copper glance.
12. Tetrahedrite, gray copper.
13. Chrysocolla, silicate.
14. Chalcopyrite, copper pyrites.
15. Malachite, green carbonate.
16. Azurite, blue carbonate.
17. Bornite, variegated pyrites.

Lead.

18. Galena, sulphide, cube.
19. " (granular, argentif.).
20. Cerussite, carbonate.
21. Anglesite, sulphate.
22. Pyromorphite, phosphate.

Tin.

23. Cassiterite, oxide (cryst.).
24. Cassiterite, oxide, toad's eye tin.
25. Cassiterite, oxide, stream tin.
26. Stannite, sulphide.

Rare Metals.

27. Columbite.
28. Wolframite.
29. Rutile.
30. Zircon, tetragonal.
31. Platinum.

Zinc.

32. Smithsonite, carbonate.
33. Calamine, silicate.
34. Zincite, oxide.
35. Sphalerite, sulphide.

Iron.

36. Iron, meteoric.
37. Magnetite, oxide, granular.
38. Magnetite, lodestone.
39. Franklinite.
40. Hematite (cryst.).
41. " specular ore.
42. Limonite, brown ore.
43. Siderite, spathic ore.
44. Chromite, chromic ore.
45. Pyrite, sulphide, octahedral.
46. Pyrite, massive.
47. Arsenopyrite, mispickel.

Mercury, Etc.

48. Cinnabar, mercury sulphide.
49. Bismuth.

Nickel and Cobalt.

50. Smaltite, arsenide.
51. Niccolite, nickel arsenide.
52. Millerite, nickel sulphide.
53. Pyrrhotite, niccoliferous pyrite.
54. Cobaltite, sulph-arsenide.
55. Garnierite, nickel silicate.
56. Asbolite, cobalt oxide.

Aluminium.

57. Corundum (crystal), oxide.
58. Corundum, emery, oxide.
59. Cryolite, fluoride.
60. Bauxite, hydrate.

Antimony and Manganese.

61. Stibnite, antimony sulphide.
62. Wad, bog manganese.
63. Pyrolusite, oxide.
64. Psilomelane, oxide.
65. Rhodochrosite, carbonate.

Other Useful Minerals.

66. Apatite, hexagonal.
67. " phosphate rock.
68. Arsenic, native.
69. Realgar, red arsenic sulphide.
70. Orpiment, yellow arsenic sulphide.
71. Dolomite, rhombohedral.
72. Dolomite, massive.
73. Orthoclase, feldspar, monoclinic.
74. Orthoclase, feldspar, cleavage.
75. Microcline, triclinic.
76. Fluorite, cubic.
77. " massive.
78. Quartz, hexagonal.
79. Calcite, dog-tooth spar.
80. " rhombohedral cleavage.
81. Graphite, plumbago.
82. Gypsum, plaster.
83. " selenite.
84. Barite, orthorhombic.
85. Celestite.
86. Muscovite, mica.

87. Molybdenite.
88. Halite, rock salt.
89. Sulphur, native.
90. Borax, monoclinic.
91. Alunite, alum stone.
92. Talc, soapstone.
93. Petroleum.
94. Anthracite coal.
95. Bituminous coal.
96. Cannel coal.
97. Elaterite, elastic bitumen.
98. Asphaltum.
99. Ozokerite.
100. Diamond.
101. Emerald.
102. Topaz, orthorhombic.
103. Garnet, dodecahedral.
104. Opal, precious.
105. Turquois.

Rocks.

106. Trachyte.
107. Basalt.
108. Greenstone.
109. Obsidian.
110. Gneiss.
111. Mica schist.
112. Granite.
113. Porphyry.
114. Syenite.
115. Sandstone.
116. Quartzose, conglomerate.
117. Limestone, coarse.
118. " lithographic.
119. Shale.
120. Chloritic schist.

***No. 25. Useful Metallic and Non-Metallic Minerals.** 300 specimens, averaging 2½x2 in., $125.00. Includes various examples of all important minerals possessing economic value.

***No. 26. Useful Metallic and Non-Metallic Minerals.** 300 specimens, averaging 1¼x1¼ in., $50.00.

***No. 27. Metallurgical Collection.** 200 specimens, averaging 2½x2 in., $75.00. Embracing all the more important ores of common, rare or precious metals.

***No. 28. Metallurgical Collection.** 200 specimens, averaging 1¼x1¼ in., $35.00.

***No. 29. Metallurgical Collection.** 100 specimens, averaging 2½x2 in., $25.00. An abridgment of No. 27.

***No. 30. Metallurgical Collection.** 100 specimens, averaging 1¼x1¼ in., $10.00.

***No. 31. Metallurgical Collection.** 50 specimens, 1¼x1¼ in. Selected from the first part of *Prospectors'* list, $4.50.

***No. 32. Ore Associations.** 60 specimens, averaging 2½x2 in., $12.00. Including all of the minerals most commonly found with valuable ores.

***No. 33. Ore Associations.** 60 specimens, averaging 1¼x1¼ in., $5.00.

***No. 34. Gold** ores. 10 specimens, averaging 1¼x1¼ in., $10.00.

***No. 35. Silver** ores. 15 specimens, averaging 1¼x1¼ in., $7.50.

***No. 36. Iron** ores. 50 specimens, averaging 1¼x1¼ in., $7.50.

***No. 37. Iron** ores. 25 specimens, averaging 1¼x1¼ in., $2.50.

***No. 38. Lead** ores. 25 specimens, averaging 1¼x1¼ in., $6.00.

*No. 39. **Copper** ores. 25 specimens, averaging 1¼x1¼ in., $5.00.

*No. 40. **Zinc** ores. 15 specimens, averaging 1¼x1¼ in., $3.00.

*No. 41. **Nickel and Cobalt** ores. 15 specimens, averaging 1¼x 1¼ in., $4.00.

*No. 42. **Rare Elements,** ores of Ce., Pt., Ta., Th., U., V., Y., Zr., etc. 25 specimens, averaging 1¼x1¼ in., $7.50.

*No. 43. **Useful Non-Metallic Minerals.** 50 specimens, averaging 1¼x1¼ in., $8.00.

*No. 44. **Pharmaceutical Collection.** 175 specimens, averaging 2½x2 in., $30.00. Most important minerals employed in Pharmaceutical Technology.

*No. 45. **Pharmaceutical Collection.** 175 specimens, averaging 1¼x1¼ in., $14.00.

*No. 46. **Rough Gems and Precious Stones.** 50 small specimens, in quartered oak cabinet, $15.00.

For sets of metals and models of cut stones, see VII, Supplies.

C. MISCELLANEOUS ELEMENTARY COLLECTIONS, ILLUSTRATING VARIOUS TEXT-BOOKS.

Collections put up to order to accompany the works of other authors.

We keep on hand a supply of the common American rocks, and can furnish typical specimens, neatly trimmed to following sizes :

3½x2¾ in. 25 cts.,	2½x2 in. 15 cts.,
1¼x1¼ in. 5 cts.,	Fragments, 3 cts.

Many common massive minerals sold at the same prices.

Put up in collections of 25 or more specimens, about 20% to 30% less. In both rocks and minerals the cost is much less when many of one kind are purchased.

The same high standard of excellence is observed in these inexpensive special sets, as with the higher priced collections. Labeled as shown in Plate IX. Lists furnished on application.

Geology.

No. 47. Collection of Rocks. 60 specimens, averaging 3½x2¾ in., $12.00. Generally from American localities.

No. 48. Collection of Rocks. 60 specimens, averaging 2½x2 in., $6.00.

No. 49. Collection of Rocks. 60 specimens, averaging, 1¼x1¼ in., $2.50.

No. 50. Collection of Rock-forming Minerals. 60 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., $12.00. Includes the most important constituents of rocks.

No. 51. Collection of Rock-forming Minerals. 60 specimens, averaging $2\frac{1}{2}$x2 in., $6.00.

No. 52. Collection of Rock-forming Minerals. 60 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., $2.50.

No. 53. Winchell Collection. Rocks and rock-forming minerals. 50 specimens, averaging $2\frac{1}{2}$x2 in., $5.00. To accompany Winchell's *Geological Excursions.* Regularly prepared by us according to list approved by the late Prof. Winchell.

No. 54. Winchell Collection. Rocks and minerals. 50 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., $2.00.

No. 55. Tarr Collection. Rocks and minerals. 75 specimens, averaging $2\frac{1}{2}$x2 in., $7.50. To accompany Tarr's *Elementary Geology,* 1897.

No. 56. Tarr Collection. 75 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., $3.00.

No. 57. Tarr Fragment Collection. 75 fragments, numbered to correspond to list, in cabinet, $1.75.

No. 58. Steele Collection. Minerals, rocks and fossils. 125 specimens, averaging $2\frac{1}{2}$x2 in., $20.00. To accompany Steele's *Fourteen Weeks in Geology,* according to list given in the book.

Mineralogy.

No. 59. Williams Collection. 39 specimens of minerals, averaging $2\frac{1}{2}$x2 in., $5.00. To accompany Williams' *Introduction to Chemistry and Blow-pipe Analysis,* according to list in the Appendix.

No. 60. Williams Collection. 39 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., $2.00.

No. 61. Moses and Parsons Collection. Minerals. 175 specimens, students' size, $14.00. Including all the more important kinds mentioned in *Mineralogy, Crystallography and Blow-pipe Analysis.*

No. 62. Moses and Parsons Fragment Collection. 175 fragments, numbered to correspond to list, in cabinet, $6.60.

***No. 63. Collins Collection.** 120 specimens of minerals, averaging $2\frac{1}{2}$x2 in., $18.00. To accompany Collins's *A First Book of Mineralogy.*

***No. 64. Collins Collection.** 120 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., $8.00.

No. 65. Dana Collection. 60 specimens of minerals, averaging $2\frac{1}{2}$x2 in., $7.50. Mentioned by Prof. E. S. Dana as being the most important for the young mineralogist to have in his collection. (For a better and more extended list, recommended in Prof. Dana's *Minerals, and How to Study Them,* see SCHOOL LIST on a preceding page.

No. 66. Dana Collection. 60 specimens, averaging 1¼x1¼ in., $3.00. Cabinet, 80 cts. extra.

No. 67. Dana Fragment Collection. 60 fragments, numbered to correspond to printed list, with cabinet, $1.90. Postage, 40 cts.

No. 68. Richards Collection. Minerals and rocks. 50 specimens, averaging 2½x2 in., $6.00. Prepared to accompany any of the *Guides for Science Teaching*, treating of mineralogy and geology, such as those published by the Boston Society of Natural History. (Mrs. Richards' *First Lessons in Minerals*, and similar little books, by Crosby and by Clapp.)

No. 69. Richards Collection. 50 specimens, averaging 1¼x1¼ in., $2.50.

No. 70. Richards Fragment Collection. 50 fragments, numbered to accompany list, in cabinet, $1.50. Postage, 35 cts.

No. 71. Agassiz Collection. 25 specimens of minerals, averaging 1¼x1¼ in., $1.50. This little set is prepared especially to interest young children. It includes only pretty specimens, showing odd forms of crystallization and bright colors; most of the kinds are used in the arts and manufactures. It is well adapted for kindergarten or primary school work. Cabinet, 50 cts. extra.

No. 72. Agassiz Fragment Collection. 25 fragments, numbered to correspond to printed list, in cabinet, 75 cts.; postage, 15 cts.

D. CRYSTALLOGRAPHY. CRYSTALS FOR THE GONIOMETER AND FOR ELEMENTARY STUDY. MICROSCOPIC CRYSTALS.

For the Goniometer and for Elementary Study.

Knowing that specimens used in the study of so exact a science as Crystallography must be of the very best, we take an especial pride in the excellence of the material selected by us to meet this demand.

These series are prepared with the single purpose of serving as working specimens in the illustration of the *Six Systems of Crystallization*. All are measurable with contact or reflecting goniometer, or both. *Two grades* of each collection are quoted. The first, styled "perfect," preferred by many teachers, are very choice specimens. There are many remarkably symmetrical and perfect crystals among them. The second are all good crystals, with sharp angles and bright planes sufficient to show the form and permit measuring. They are often smaller, and the proportion of complete crystals is lower than in the first grade.

For convenience they are put up in the polished oak compartment cabinets, as shown in Plate X, representing collection No. 79. Cabinets especially fitted with short, thick vials to hold the crystals, are substituted for the compartment pattern, at $1.50, extra, per 100 specimens. Each crystal

(or vial) is numbered to correspond to list. Metal holders or wood stands, mounted on blocks, with large printed label, for open case display, cost about 10 cts. extra, for each specimen.

Size averages from $\frac{1}{4}$ in. to $\frac{3}{4}$ in. diameter, although larger can be arranged on order. The sets of 100 and over often include a number of distinct habits of one mineral; those of 50 and 25 are all different species.

***No. 73. Collection of 200 Perfect Crystals,** $120.00.

***No. 74. Collection of 200 Crystals,** $60.00.

***No. 75. Collection of 100 Perfect Crystals,** $60.00.

***No. 76. Collection of 100 Crystals,** $30.00.

No. 77. Collection of 50 Perfect Crystals, $20.00.

No. 78. Collection of 50 Crystals, $10.00. Postage, 35 cts. extra.

No. 79. Collection of 25 Perfect Crystals, $6.00. Postage, 23 cts.

No. 80. Collection of 25 Crystals, $3.00. Postage, 20 cts. extra.

No. 81. Special Series of Six Large Crystals, $15.00. Showing a simple form of each of the six systems: 1, Fluorite; 2, Vesuvianite; 3, Quartz; 4, Thenardite; 5, Orthoclase; 6, Microcline. They are about three inches in diameter and form an excellent set for the lecture-room or museum.

The following is an incomplete list of our detached crystals, from which above collections are selected. The stock changes constantly, but all the common and many of the rare species can always be furnished in good crystallizations.

All are well-defined, measurable crystals, averaging $\frac{1}{4}$ in. to $\frac{3}{4}$ in. diameter. They generally cost from 10 cts. to 50 cts. each, those starred (*) bring 75 cts. to $2.00 or $3.00 each. Small but well terminated crystals of such minerals as Quartz, Topaz, Zircon, Dysanalyte and Gypsum can be furnished for class use at 10 cts. per dozen.

A variety of habits and types of certain species are kept in stock, which are not enumerated here.

Abbreviations.—Isom., Isometric; Tetr., Tetragonal; Hex., Hexagonal; Rhomb., Rhombohedral; Orth., Orthorhombic; Mono., Monoclinic; Tric., Triclinic; c., suitable for contact goniometer; r., suitable for reflecting goniometer.

c.r. Acmite, Mono.
r. Adamite, Orth.
r. Albite, Tric.
c. Alexandrite, twin. Orth.
c. * Allanite, Mono.
c.r. Amphibole, Mono.
c.r. Analcite, Isom.
c. Andalusite, Orth.
c.r. Anglesite, Orth.
c.r. Ankerite, Rhomb.
c. Anorthite, twin, Tric.
c.r. Apatite, Hex.
c.r. Apophyllite, Tetr.
c.r. Aragonite, Orth.
c.r. " twin.
c.r. Arfvedsonite, Mono.
c. * Argentite, Isom.
c.r. Arsenopyrite, Orth.
c.r. " twin.
c.r. Axinite, Tric.
c.r. Azurite, Mono.
c.r. Barite, Orth.
c.r. Beryl, Hex.

r. Beryllonite, Orth.
c.r. Biotite, Mono.
r. Boracite, Isom.
c. Borax, Mono.
r. Bournonite, twin, Orth.
r. Brandtite, Tric.
r. Bromlite, Orth.
c.r. Brookite, Orth.
r.* Brucite, Rhomb.
r. Calamine, Orth.
c.r. Calcite, Rhomb.
c.r. " twin.
c.r. Celestite, Orth.
r. Cerussite, Orth.
c.r. Chabazite, Rhomb.
r. Chalcocite, Orth.
r. Chalcopyrite, Tetr.
c. Chesterlite, Tric.
c.r. Chondrodite, Mono.
c.r. Chrysoberyl, twin, Orth.
r. Chrysolite, Orth.
r. Cinnabar, Rhomb.
c. Cleveite, Isom.
c.r. Clinochlore, twin, Mono.
c.r. Cobaltite, Isom.
c.r. Colemanite, Mono.
c. Columbite, Orth.
c. Copper, Isom.
c.r. Corundum, Rhomb.
r.* Crocoite, Mono.
r.* Cryolite, Mono.
r. Cuprite, Isom.
c.r. Danburite, Orth.
r. Datolite, Mono.
r.* Diamond, Isom.
r.* Diaspore, Orth.
r. Dioptase, Rhomb.
c.r. Dolomite, Rhomb.
r. Durangite, Mono.
c.r. Dysanalyte, Isom.
c.r.* Edingtonite, Tetr.
c.r. Endlichite, Hex.
c. Enstatite, Orth.
r.* Epistilbite, Mono.
r. Euchroite, Orth.
c.r. Eudialyte, Rhomb.
c.r. Eudidymite, Mono.
r. Euxenite, Orth.
c.r. Fluorite, Isom.
c.r. Franklinite, Isom.
c.r. Gahnite, Isom.
c.r. Galena, Isom.
c. Gay-Lussite, Mono.
c. Glauberite, Mono.
c.r. Glaucodot, Orth.
c.r. Gmelinite, twin, Rhomb.
r. Göthite, Orth.
c.r. Gypsum, Mono.
c.r. " twin.
c. Halite, Isom.
c. Hanksite, Hex.
r. Harmotome, twin, Mono.
c. Hauerite, Isom.
c.r. Hematite, Rhomb.
c.r.* Herderite, Orth.
c.r. Heulandite, twin, Mono.
c.r. Ilvaite, Orth.
c.r. Keilhauite, Mono.
r. Laumontite, Mono.
r.* Laurionite, Orth.
c. Lazulite, Mono.
c.r. Leadhillite, twin, Mono.
c. Leucite, Isom.
r. Libethenite, Orth.
r. Linarite, Mono.
r.* Liroconite, Mono.
c.r. Magnesioferrite, Isom
c.r. Magnetite, Isom.
r. Manganite, Orth.
r. Marcasite, twin, Orth.
r. Matlockite, Tetr.
c.r. Martite, Isom.
r.* Mazapilite, Orth.
r. Meionite, Tetr.
c.r. Mellite, Tetr.
r. Meneghinite, Orth.
c. Microcline, Tric.
c. " twin.
c.r.* Microlite, Isom.
c. Molybdenite, Hex.
c. Monazite, Mono.
c.r. Monticellite, Orth.
c.r. Muscovite, Hex.
r. Natrolite, Orth.
r. Newberyite, Orth.
r. Octahedrite, Tetr.
r. Olivenite, Orth.
r. Orpiment, Orth.
c.r. Orthoclase, Mono.
c. " twin.
r. Pachnolite, Mono.
r. Pectolite, Mono.
r. Penninite, twin, Mono.
c.r. Perovskite, Isom.
c.r. Phenacite, Rhomb.
r. Phillipsite, twin, Mono.
c.r. Phosgenite, Tetr.
c. Pinite, Mono.
c. Prehnite, Orth.
r. Pyrargyrite, Rhomb.
c.r. Pyrite, Isom.
c. " twin.
r. Pyrolusite, Orth.
c.r. Pyromorphite, Hex.
c. * Pyrosmalite, Rhomb.
c.r. Pyroxene, Mono.
c. " twin.
r. Pyrrhotite, Hex.
c.r. Quartz, Rhomb.
c. " twin.
r. Realgar, Mono.
c.r. Rhodochrosite, Rhomb.
c.r. Rhodonite, Tric.
c.r. Rutile, Tetr.
c. " twin.
c.r. Scheelite, Tetr.
r. Scolecite, Mono.
r. Scorodite, Orth.
r. Senarmontite, Isom.
c.r. Siderite, Rhomb.
r.* Smaltite, Isom.
r. Smithsonite, Rhomb.
c.r. Sphalerite, Isom.
c.r. Spinel, Isom.
c.r. " twin.
c. Spodumene, Mono.
c. Staurolite, Orth.
c. " twin.
r. Stephanite, Orth.
c.r. Stibnite, Orth.
c. Strontianite, twin, Orth.
c. Struvite, twin, Orth.
c.r. Sulphur, Orth.
r. Tetrahedrite, Tetr.
c. Thenardite, Mono.
c. " twin.
r. Thomsenolite, Mono.
c. Thorite, Tetr.
c.r. Titanite, Mono.
c. " twin.
c.r. Topaz, Orth.
r. Torbernite, Tetr.
c.r. Tourmaline, Rhomb.
c. Troostite, Rhomb.
c.r. Ullmanite, Isom.
c.r. Vanadinite, Hex.
c.r. Vesuvianite, Tetr.
r. Vivianite, Mono.
c. * Wagnerite, Mono.
c. Wernerite, Tetr.
c. Witherite, twin, Orth.
c.r. Wolframite, Mono.
c. Wollastonite, Mono.
c.r. Wulfenite, Tetr.
c.r. Xenotime, Tetr.
c.r. Zircon, Tetr.
c. " twin.
r. Zoisite, Orth.
r. Zunyite, Isom.

PSEUDOMORPHS.

Unless marked "r" or "c_1" they are not measureable; many are matrix specimens.

	*	Gold	pseudo. after	Sylvanite.
		Copper	"	Azurite.
		Galena	"	Pyromorphite.
c.		Chalcocite	"	Chalcopyrite.
		Chalcopyrite	"	Siderite.
		Pyrite	"	Fluorite.
	*	"	"	Calcite.
		Marcasite	"	Fluorite.
		Hagemannite	"	Cryolite.
		Quartz	"	Fluorite.
		"	"	Crocidolite.
c.		"	"	Calcite.
		"	"	Dolomite.
		"	"	Pyroxene.
		"	"	Wollastonite.
		"	"	Pectolite.
		"	"	Coral (Beckite)
		"	"	Barite.
		Thinolite	"	Gay-Lussite.
r.		Hematite	"	Siderite.
		"	"	Pyrite.
		"	"	Calcite.
		"	"	Ilvaite.
		Spinel	"	Corundum.
c.r.		Rutile	"	Brookite.
		"	"	Hematite.
		Diaspore	"	Margarite.
c.r.		Limonite	"	Pyrite.
c.		"	"	Siderite.
		"	"	Breunnerite.
c.	*	Wad	"	Siderite.
c.	*	Calcite	"	Quartz.
c.		"	"	Aragonite.
c.		"	"	Hanksite.
	*	"	"	Strontianite.
		Dolomite	pseudo. after	Calcite.
		"	"	Malacolite.
		Siderite	"	Dolomite.
		Smithsonite	"	Calcite.
		Cerussite	"	Calcite.
		"	"	Barite.
c.r.		Malachite	"	Cuprite.
r.	*	"	"	Azurite.
		Nesquehonite	"	Lansfordite.
		Pseudoleucite.		
c.		Amphibole	"	Pyroxene.
		Calamine	"	Galena.
		Analcite	"	Copper.
		Muscovite	"	Nephelite.
c.r.		Prochlorite	"	Garnet.
c.		Serpentine	"	Enstatite.
	*	"	"	Chrysolite.
		"	"	Pyroxene.
		"	"	Feldspar.
c.	*	Talc	"	Tremolite.
c.		"	"	Pyroxene.
		"	"	Epidote.
r.	*	"	"	Chondrodite.
	*	Allophane	"	Azurite.
	*	Mimetite	"	Anglesite.
	*	Adamite	"	Azurite.
		Lesleyite	"	Corundum.
		Uranotil	"	Uraninite.
	*	Anglesite	"	Galena.
	*	"	"	Cerussite.
	*	"	"	Matlockite.
		Leadhillite	"	Galena.
		"	"	Calcite.
c.r.		Wolframite	"	Scheelite.

Groups of Microscopic Crystals as Box-Mounts.

The increasing popularity and wide application of the microscope is attested by the demand we find for this class of specimens. They make inexpensive mounts, surprising and delighting the student by the wonderful beauty of crystallization revealed by the lens.

The following list mentions the most desirable minerals in stock; the minute crystals are grouped on small pieces of gangue, which can be broken to convenient size for mounting. Selected specimens can generally be furnished at 15 cts. each, those starred (*) at 25 cts. to $1.00 each, according to rarity. All are carefully labelled.

Minerals mentioned in italics are of unusual beauty and value for microscopic examination. It is from these that the following collections are carefully selected:

Adamite, green.
Aegirite.
*Aguilarite.
Albite.
*Allactite.
Alunite.
Amphibole var. Breislakite.
Amphibole, Vesuvius.
Amphibole var. Byssolite.
Analcite.
Analcite, Australia.

Anglesite.
Anglesite, Australia.
Anorthite, Vesuvius.
Apophyllite.
Aragonite.
Atacamite, Chile.
Aurichalcite.
Autunite.
Axinite, Switzerland.
*Axinite, New Jersey.
Azurite.
Azurite, Australia.
Biotite, Vesuvius.
Bolëite.
Boracite.
Brandtite.
*Breithauptite.
Brochantite.
Bromlite (Alstonite).
Brookite.
*Brucite.
Cacoxenite.
Calamine.
Calcite.
*Caledonite.
*Calomel.
Cassiterite, England.
Cassiterite, Mexico.
Celestite.
Cerargyrite.
Cerussite.
Chabazite.
Chalcocite.
Chalcophanite.
Chalcophyllite.
Chalcopyrite, Pa.
Chalcopyrite on blende.
Chalcopyrite on pearl spar.
Chalcosiderite.
Childrenite.
Chondrodite, Vesuvius.
Cinnabar.
Clinoclasite.
Conichalcite.
Copper.
Copper (arborescent), Aust.
Cryolite.
Cumengëite.
Cumengëite, trilling.
Cumengëite, truncated trilling.
Cuprite.
Cuprite var. Chalcotrichite.
Datolite.
Descloizite.
Descloizite var. Cuprodescloizite.
Diaspore.
*Dioptase.
Dioptase, in Quartz.
Dolomite.
Embolite on Limonite, Aust.
Endlichite, different forms and colors.
Epidote, green.
Epidote, gray.
Erinite.
Erythrite.
Euchroite.
*Eulytite.
Gahnite.
Garnet var. Essonite.
Garnet var. Melanite.
Garnet var. Ouvarovite.
Garnet var. Topazolite.
Gmelinite, Australia.
*Gold.
*Greenockite.
*Guarinite.
Gypsum.
Harmotome.
*Haüynite, Vesuvius.
Hematite, Elba.
Hematite, England.
Hematite, Mt. Etna.
*Herrengrundite.
Heulandite.
Jamesonite, var. Heteromorphite.
Jarosite.
*Långbanite.
*Langite.
*Lanthanite.
Laumontite.
Laurionite.
Lawsonite.
Libethenite.
Linarite, Australia.
*Liroconite.
Magnetite.
Malachite.
Manganite.
Marcasite.
Marcasite in Calcite.
Melanophlogite.
Meneghinite.
Mercury.
Mesolite.
Mesolite, Australia.
*Metacinnabarite.
Millerite, Pa.
Millerite, in Calcite, Mo.
Mimetite.
Mixite.
Nadorite.
Natrolite.
Natrolite, Australia.
Nephelite, Vesuvius.
*Newberyite, Australia.
*Octahedrite (Anatase).
Offrétite.
Oligoclase, var. Sunstone.
Olivenite.
Opal, with enclosure.
Orpiment.
Orthoclase, var. Sanadin.
Pachnolite.
Pectolite.
Penninite.
Perthite (Sunstone).
*Phacolite, Australia.
Pharmacosiderite.
Phenacite.
Phillipsite.
Phillipsite, Australia.
Phillipsite on acicular Calcite, Australia.
Phosgenite.
*Piedmontite.
Polybasite.
*Proustite.
*Pucherite,
*Pyrargyrite.
Pyrite, New Jersey.
Pyrite, Pennsylvania.
Pyrolusite.
Pyromorphite (Aust.) brown.
Pyromorphite (Ger.) brown.
Pyromorphite (Pa.) green.
Pyroxene, Vesuvius.
Pyrrhotite.
Quartz.
*Quartz, cont. Albite.
Quartz, cont. Chlorite.
Quartz, cont. Hematite.
*Quartz, cont. Pyrophyllite.
Quartz, cont. Rutile.
Ralstonite.
Realgar.
Remingtonite.
Rhodonite, var. Paisbergite.
Roselite.
Rutile.
Sarkinite.
Scorodite.
Senarmontite.
Serpierite.
Siderite.
Silver, wire.
*Silver, cryst.
Smithsonite.
Sodalite, Vesuvius.
*Sphærocobaltite.
Sphærostilbite, Australia.
Sphalerite.
Sphalerite, var. Ruby Blende.
Spinel, Vesuvius.
*Stephanite.
Stibnite.
Stilbite, New Jersey.
Stilbite, Oregon.
Sulphur, California.
Sulphur, Sicily.
Svabite.
*Sylvanite.
Tennantite.
Tenorite.
Thaumasite.
Thomsenolite.
Thomsonite.
Titanite.
Topaz, enclosing Quartz.

Topaz, enclosing Hematite.
Torbernite.
*Tridymite.
Tyrolite.
Ulexite.
Valentinite.
Vanadinite, brown.
Vanadinite, red.
Variscite.
Vesuvianite.
Vivianite.
* *Vivianite,* Australia.
Wavellite, green.
Wavellite, white.
Wulfenite, red, Arizona.
Wulfenite, red, Pa.
Wulfenite, yellow.
Zircon.

***No. 82. Collection of 100 Microscopic Minerals,** $18.00. In polished oak cabinet.

***No. 83. Collection of 100 Microscopic Minerals,** $25.00. The preceding, mounted in black boxes.

***No. 84. Collection of 50 Microscopic Minerals,** $8.00. In polished oak cabinet.

***No. 85. Collection of 50 Microscopic Minerals,** $12.00. The preceding, mounted in black boxes.

No. 86. Collection of 25 Microscopic Minerals, $4.00. In polished oak cabinet.

No. 87. Collection of 25 Microscopic Minerals, $6.00. The preceding, mounted in black boxes.

E. SERIES ILLUSTRATING THE HARDNESS, COLOR, SPECIFIC GRAVITY AND OTHER PHYSICAL CHARACTERS OF MINERALS.

In preparing these sets, every care is taken to secure exact representatives of the different physical properties illustrated. They are put up in specimens neatly trimmed to two principal sizes.

First.—For the private collector, museum or school, in show specimens averaging 3½x2¾ inches, mounted on polished oak (or cherry) blocks, as shown in Plate IX, with large printed label, mentioning the particular property or form shown by the specimen with name, composition and locality.

Second.—Students' specimens for practical work, averaging 1¼x1¼ inches and labeled like the larger size. Arranged in polished quartered oak compartment cabinet, as shown in Plate X.

All are kept in stock, prepared and ready for shipment immediately on receipt of order.

No. 88. Structure Series. 25 specimens, averaging 3½x2¾ in., on blocks, $12.00. Various forms of columnar, lamellar and granular structures; also imitative shapes.

No. 89. Structure Series. 25 specimens, averaging 1¼x1¼ in. Like No. 88. In compartment cabinet, $4.00.

No. 90. Cleavage and Fracture Series. 12 specimens, averaging 3½x2¾ in., on blocks, $5.00.

(*a*) Cleavage;
1. *Basal,* 3. *Cubic,* 5. *Dodecahedral,*
2. *Prismatic,* 4. *Octahedral,* 6. *Rhombodedral.*
(*b*) Fracture;
7. *Conchoidal,* 9. *Uneven,* 11. *Earthy,*
8. *Even,* 10. *Hackly,* 12. *Splintery.*

No. 91. Cleavage and Fracture Series. 12 specimens, like preceding, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $1.50.

No. 92. Hardness Series. 12 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $8.00. According to Mohs' scale; all but first crystallized:

1. Talc, 5. Apatite, 8. Topaz,
2. Gypsum, 6. Feldspar, 9. Corundum,
3. Calcite, 7. Quartz, 10. Diamond.
4. Fluorite,

With lodestone (for magnetism), honestone (for streak) and file for testing hardness.

No. 93. Hardness Series. 12 specimens, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., like preceding, in compartment cabinet, $1.75; postage, 34 cts.

No. 94. Hardness Series. Same as No. 93, without diamond, $1.00; postage, 34 cts.

No. 95. Tenacity Series. 5 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $2.50.

1. *Brittle,* 3. *Malleable,* 5. *Elastic.*
2. *Sectile,* 4. *Flexible,*

No. 96. Tenacity Series. 5 specimens like above, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, 75 cts.

No. 97. Specific Gravity Series. 25 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $25.00. Arranged to show even gradations of density from minerals of very low to very high specific gravity. Pure, crystalline minerals are selected.

No. 98. Specific Gravity Series. 25 specimens like above, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $7.00.

NOTE.—For sets of metals cut in strips of different lengths, according to density, see VII, Supplies.

No. 99. Diaphaneity Series. 5 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $2.00.

1. *Transparent,* 3. *Translucent,* 5. *Opaque.*
2. *Semi-transparent,* 4. *Semi-translucent,*

No. 100. Diaphaneity Series. 5 specimens like above, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, 60 cts.

No. 101. Color Series. 60 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $30.00. According to following table, embracing all the more essential variations. It makes an exceedingly handsome and attractive set.

a. Metallic Colors.

1. *Copper-red.*
2. *Bronze-yellow.*
3. *Brass-yellow.*
4. *Gold-yellow.*
5. *Silver-white.*
6. *Tin-white.*
7. *Lead-gray.*
8. *Steel-gray.*

b. Non-metallic Colors.

White.

9. *Snow-white.*
10. *Reddish-white.*
11. *Yellowish-white.*
12. *Grayish-white.*
13. *Greenish-white.*
14. *Milk-white.*

Gray.

15. *Bluish-gray.*
16. *Pearl-gray.*
17. *Greenish-gray.*
18. *Yellowish-gray.*
19. *Ash-gray.*

Black.

20. *Velvet-black.*
21. *Greenish-black.*
22. *Brownish-black.*
23. *Bluish-black.*

Blue.

24. *Azure-blue.*
25. *Violet-blue.*
26. *Prussian-blue.*
27. *Indigo-blue.*

Green.

28. *Verdigris-green.*
29. *Leek-green.*
30. *Emerald-green.*
31. *Apple-green.*
32. *Grass-green.*
33. *Pistachio-green.*
34. *Olive-green.*

Yellow.

35. *Sulphur-yellow.*
36. *Straw-yellow.*
37. *Honey-yellow.*
38. *Lemon-yellow.*
39. *Ochre-yellow.*
40. *Cream-yellow.*
41. *Orange-yellow.*

Red.

42. *Hyacinth-red.*
43. *Brick-red.*
44. *Scarlet-red.*
45. *Flesh-red.*
46. *Carmine-red.*
47. *Rose-red.*
48. *Crimson-red.*
49. *Peach-blossom-red.*
50. *Cherry-red.*

Brown.

51. *Reddish-brown.*
52. *Clove-brown.*
53. *Chestnut-brown.*
54. *Yellowish-brown.*
55. *Liver-brown.*

c. Color Phenomena.

56. *Chatoyancy.*
57. *Opalescence.*
58. *Iridescence.*
59. *Phosphorescence.*
60. *Pleochroism.*

No. 102. Color Series. 60 specimens, arranged according to above table, averaging $1\frac{1}{4}$x$\frac{1}{4}$ in., in compartment cabinet, $10.00.

No. 103. Color Series. 25 specimens, selected from above table, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $12.00.

No. 104. Color Series. 25 specimens, like preceding, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $4.00.

No. 105. Lustre Series. 15 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $8.00.

(*a*) *Kinds of lustre;*

1. *Metallic,*
2. *Sub-metallic,*
3. *Adamantine,*
4. *Metallic-adamantine,*
5. *Vitreous,*
6. *Sub-vitreous,*
7. *Resinous,*
8. *Pearly,*
9. *Metallic-pearly,*
10. *Silky,*
11. *Dull.*

(*b*) *Degrees of intensity;*

12. *Splendent,*
13. *Shining,*
14. *Glistening,*
15. *Glimmering.*

No. 106. Lustre Series. 15 specimens, like above, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $3.00.

No. 107. Taste and Odor Series. 12 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $4.00.

No. 108. Taste and Odor Series. 12 specimens, like preceding, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $1.25.

No. 109. Fusibility Series. 6 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in., on blocks, $2.00.

1. Stibnite,	3. Almandite,	5. Orthoclase.
2. Natrolite,	4. Actinolite,	6. Bronzite.

No. 110. Fusibility Series. 6 specimens, as above, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, 60 cts.; postage, 17 cts.

No. 111. Complete Physical Series. Includes all of the foregoing series: Structure, 25; Cleavage and Fracture, 12; Hardness, 12; Tenacity, 5; Specific Gravity, 25; Diaphaneity, 5; Color, 60; Lustre, 15; Taste and Odor, 12; Fusibility, 6; total, 177 specimens, averaging $3\frac{1}{2}$x$2\frac{3}{4}$ in. Either mounted on blocks or in quartered oak drawer cabinet. An invaluable aid to a proper understanding of this important chapter of mineralogy and indispensable in a thorough course of study, $90.00.

No. 112. Complete Physical Series. 177 specimens, like preceding, averaging $1\frac{1}{4}$x$1\frac{1}{4}$ in., in compartment cabinet, $30.00.

F. SETS OF MINERALS FOR BLOWPIPE PRACTICE AND CHEMICAL ANALYSIS.

The minerals used in the following series are as nearly chemically pure as they occur in nature, and are all typical examples of distinct species. To meet an increasing demand, they are prepared in three forms:

First.—Good-sized pieces put up in six-ounce wide mouth, glass-stoppered bottles, holding about one-half to one pound of each mineral. Labeled with large printed label, giving name, composition and locality.

Second.—About one ounce of each mineral in strong glass vials, fitting neatly into a quartered oak cabinet, made especially to hold 100 vials. Each vial is numbered to correspond to list.

Third.—Specimens averaging $\frac{3}{4}$ in. diameter, weighing about two-fifths of an ounce, numbered to correspond to list; in quartered oak compartment cabinet. All the following are kept in stock, prepared and ready for shipment immediately on receipt of order:

No. 113. Advanced Blowpipe Collection. 300 minerals in 6-oz. bottles, $100.00. Selected mostly from the University Collection List. Common varieties based on chemical variation, and some rare species are illustrated. Can be arranged to include such minerals as are required by purchaser.

No. 114. Advanced Blowpipe Collection. 300 specimens, duplicates of above, in small vials, fitted in special cabinet, $20.00.

No. 115. Advanced Blowpipe Collection. 300 small minerals, like preceding, in compartment cabinet, $14.00.

No. 116. Advanced Blowpipe Collection. 200 important mineral species, in 6-oz. bottles, $60.00. Selected from the University Col-

lection List. Can generally be arranged to include such minerals as are required by purchaser.

No. 117. Advanced Blowpipe Collection. 200 different mineral species, like above, in small vials, fitted in special cabinet, $14.00.

No. 118. Advanced Blowpipe Collection. 200 different mineral species. Small specimens in compartment cabinet, $8.00.

No. 119. Elementary Blowpipe Collection. 100 different mineral species, in 6-oz. bottles, $35.00. According to following list, arranged to include all of the kinds commonly taken up in a short course. The names not starred (*) include all minerals most essential in elementary practice, and are especially recommended in the works of Von Kobell, Brush or Dana.

List of Elementary Blowpipe Collection. 100 Specimens.

Arsenic.
1. Realgar.
2. Orpiment.

Antimony.
3. Stibnite.

Molybdenum.
4. Molybdenite.

Silver.
5. Embolite.
*6. Stephanite.

Mercury.
7. Cinnabar.

Copper.
8. Chalcocite.
9. Bornite.
10. Chalcopyrite.
11. Tetrahedrite.
12. Cuprite.
13. Malachite.
*14. Azurite.
15. Atacamite.

Lead.
16. Galena.
*17. Bournonite.
18. Pyromorphite.
19. Vanadinite.
20. Cerussite.
21. Wulfenite.

Tin.
22. Cassiterite.

Titanium.
23. Rutile.

Iron.
24. Pyrrhotite.
25. Pyrite.
26. Arsenopyrite.
27. Hematite.
28. Magnetite.
*29. Franklinite.
30. Chromite.
31. Limonite.
32. Siderite.
*33. Ilmenite.
*34. Vivianite.

Nickel.
35. Millerite.
36. Niccolite.
*37. Garnierite.

Cobalt.
38. Smaltite.
39. Cobaltite.

Manganese.
40. Pyrolusite.
41. Psilomelane.
42. Rhodochrosite.
43. Rhodonite.
44. Manganite.

Zinc.
45. Sphalerite.
*46. Zincite.
47. Calamine.
48. Smithsonite.
*49. Willemite.

Aluminium.
50. Corundum.
*51. Bauxite.
52. Cryolite.
*53. Wavellite.
*54. Kaolin.
55. Alunite.

Calcium.
56. Fluorite.
57. Calcite.
58. Apatite.
59. Anhydrite.
60. Gypsum.
61. Brucite.
62. Magnesite.
63. Dolomite.

Barium.
64. Barite.
65. Witherite.

Strontium.
66. Strontianite.
67. Celestite.

Sodium and Potassium.
*68. Halite.
*69. Colemanite.
70. Borax.
*71. Carnallite.

Oxide of Silicon.
*72. Quartz.

Silicates.
73. Orthoclase.
*74. Albite.
*75. Enstatite.
*76. Pyroxene.
77. Wollastonite.
78. Amphibole, Actinolite.
*79. Beryl.
*80. Nephelite.
81. Garnet, Almandite.
82. Lepidolite.
*83. Clinochlore.
*84. Chrysolite.
*85. Zircon.
*86. Wernerite.
*87. Epidote.
88. Tourmaline.
*89. Topaz.
90. Talc.
*91. Serpentine.
92. Datolite.
93. Apophyllite.
94. Pectolite.
95. Natrolite.
*96. Stilbite.

Niobium.
*97. Columbite.

Uranium.
98. Uraninite.

Tungsten.
99. Wolframite.
100. Scheelite.

No. 120. Elementary Blowpipe Collection. 100 different mineral species, in small glass vials, fitted in special cabinet, $7.50. Numbered according to above list.

No. 121. Elementary Blowpipe Collection. 100 different mineral species in small specimens. Compartment cabinet, $4.50. Numbered according to above list.

No. 122. Elementary Blowpipe Collection. 70 different mineral species, in 6-oz. bottles, $30.00. Recommended as most essential, by Von Kobell, Brush or Dana. Above list, omitting starred names.

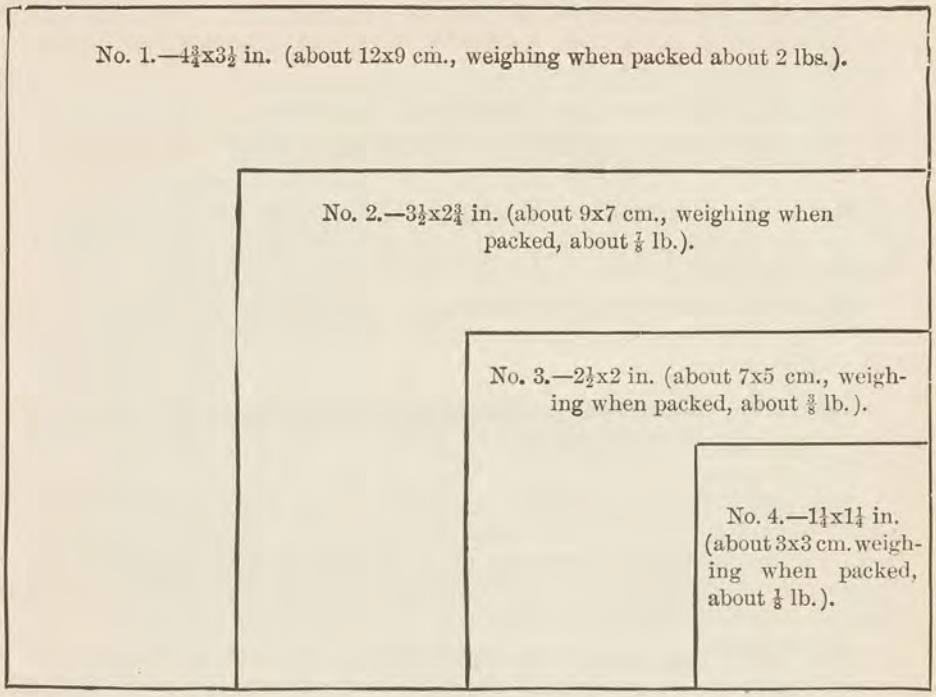
No. 123. Elementary Blowpipe Collection. 70 minerals, in small vials, fitted in special cabinet, $6.50. According to above list, omitting starred names.

No. 124. Elementary Blowpipe Collection. 70 minerals. Small specimens in compartment case, $3.50. Above list, omitting starred names.

No. 125. Blowpipe Set. 35 minerals, in glass bottles, $12.50. A very limited number of specimens required in a few of the principal tests. Can be used with elementary books for beginners, giving but a short chapter on blowpiping. (According to list given in appendix of Dana's *Minerals, and How to Study Them.*)

No. 126. Beginners' Blowpipe Set. 35 small specimens, like No. 125, in compartment cabinet, $1.50; postage, 20 cts.

For minerals sold singly, by the pound, see following pages.



Standard collections are selected in specimens of four sizes as above. They are *average*, many of the specimens ranging ½ in. larger.

No. 1.—4¾x3½ in. is intended for institutions wishing to make an attractive and showy display in glass cases. Special attention is given to large and striking crystallizations and bright colors in the common minerals, and in all cases to the securing of the most typical examples obtainable.

No. 2.—3½x2¾ in. is for practical purposes, as useful as No. 1, and not only makes a good showing in open case or drawer, but is the best working size.

No. 3.—2½x2 in. is intended for students and professional men and makes a convenient and light hand specimen. It is a size often selected by teachers for class use, where economy of space and funds are necessary.

No. 4.—1¼x1¼ in. is an inexpensive specimen for students, prospectors, or those desiring a sample barely large enough to show the characteristics of the mineral, and has the advantage of being portable in the small compartment cabinets. The proportion of good crystallizations is smaller than in the larger size.

Fragments, for blow-pipe practice, or in pupils' sets to accompany school collections, are of irregular shape and average about ¾ in. diameter. They weigh about 4 lbs. per 100 ready for mailing in compartment cabinets.

Quantities of the common minerals in small sizes at special rates.

Pasteboard Trays (see VII, Supplies) to fit above sizes. Also compartment and drawer cabinets and cases.

III.

MINERALS SOLD BY WEIGHT

FOR USE IN

CHEMICAL AND TECHNICAL LABORATORIES.

POUND LIST.

(For collections of minerals for blowpipe practice, see preceding pages.)

The constant and increasing demand for this class of mineralogical material, necessitated including in the following list all minerals required in blowpipe practice or wet analysis, as well as rare compounds demanded in expert technical work. Quotations can be furnished on many minerals in stock not mentioned here.

Chemical Names are given in detail in the Metallic Classification at the end of the *Complete Mineral Catalogue*. Under each important metal are arranged the different minerals in which it occurs, in the order of percentage—*e. g.*, Cerium,— —Silicate;—Cerite, Mosandrite, Johnstrupite, Allanite. The various combinations of each metal make sub-headings. These new tables will be found useful to both students and investigators.

Prices have in many cases been lowered, and will vary slightly from time to time according to the supply. They are quoted per pound avoirdupois. One-half pound will be sold *pro rata*, ten cents being the minimum charge. Minerals quoted at 5 cents are 10 cents per lb. for less than five lbs.

Large Quantities at lower rates. The following are sold in 100 to 200 lb. lots at 3 cents per lb.: Arsenopyrite, Barite, Bauxite, Calcite (various), Chromite, Emery, Fluorite, Gypsum (various), Lepidolite, Limonite, Magnesite, Magnetite, Orthoclase, Phosphate Rock, Psilomelane, Pyrite, Quartz (various), Siderite. Prices of other economic minerals on application.

Quality.—Minerals are selected pure, or nearly so, except in the few instances where the approximate % of pure mineral in gangue is noted. Each package is accurately labeled with printed label, giving name, composition and locality. These minerals are all in stock, and can be shipped immediately on receipt of order.

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1 Kilogram (K)=about 2.2 pounds avoirdupois; 30 grams (Gr.)=about 1. ounce avoirdupois.

	Per lb. $ cts.
Actinolite,	$0 05
Aegirite,	1 50
Agate, banded, Brazil,	25
" moss, Wyoming,	50
Alabandite, 15%,	35
Alabaster, Italy,	15
Albertite,	15
Albite,	05
Allanite (Orthite),	15
Allemontite,	1 25
Almandite,	15
Alunite,	25
Amarantite, per oz., $1.00.	
Amazon Stone,	15
Amber,	2 00
Amblygonite,	50
Amethyst, Ger.,	35
Amphibole, Actinolite,	05
" Asbestus,	15
" Edenite,	10
" Hexagonite,	50
" Hornblende,	05
" Tremolite,	25
Analcite,	2 00
Andalusite,	1 50
Anglesite,	1 00
Anhydrite, N. B.,	10
" Germany,	35
Annabergite,	2 50
Anorthite, xls., per. oz., $1.00.	
Anthophyllite,	20
Anthracite Coal,	05
Antimony, native,	1 50
Apatite, Canada,	05
" Phosphate Rock, Fla. or S. C.,	05
Apophyllite,	1 25
Aquacreptite,	50
Aquamarine, per oz., 50c.	
Aragonite,	20
Argentite, per oz., $1.50.	
Argyrodite, per gr., 35c.	
Arkansite,	1 25
Arsenic, native,	1 50
Arseniosiderite,	2 50
Arsenopyrite,	15
Asbestus,	15
Asphaltum,	05
Astrophyllite, 20%,	35
Atacamite, 25%,	75
Augite, xls.,	50
Axinite,	1 50
Azurite,	50
Barite, massive,	05
" fetid, granular,	15
Barytocalcite,	50
Bastnäsite, per oz., $4.00.	
Bauxite, Ga. or France,	10
Berthierite,	2 00
Beryl, opaque,	10
" Aquamarine, per oz., 50c.	
" Emerald, xls., per oz., 75c.	
Beryllonite, xls., per oz.,	2 50
Biotite,	25

	Per lb. $ cts,
Bischofite,	$0 75
Bismuth, native, per oz., 35c.	
Bismuthinite, per oz., 75c.	
Bituminous Coal (iridescent),	05
Blende,	10
Boleite, per gr., 25c.	
Borax,	25
Bornite,	50
Boulangerite,	1 25
Bournonite, per oz., 35c.	
Braunite, 75%, Sweden,	35
Breithauptite,	1 25
Brochantite, per oz., 25c.	
Bronzite,	25
Brookite, Arkansite,	1 25
Brucite,	75
Buhrstone,	05
Cairngorm Stone,	10
Calamine,	15
Calcite, Ordinary Calc Spar,	05
" blue,	15
" Chalk,	05
" cleavable, Mo.,	10
" Iceland Spar, Mo.,	1 00
" " flawless, Iceland,	2 00
" " large flawless pieces for optical work, Iceland,	4 00
" Limestone,	05
" Lithographic Limestone,	05
" Marble,	05
" Mexican Onyx,	15
" Oölite,	05
" Travertine,	05
" red or orange,	25
Calc Spar,	05
Cancrinite, 15%,	25
Cannel Coal,	05
Carnallite,	35
Cassiterite, "Stream Tin," S. D.,	25
" "Wood Tin," Mexico,	50
Celestite,	10
Cerargyrite, per oz., 50c.	
Cerite,	1 00
Cerussite,	50
Chabazite,	1 00
Chalcedony,	25
Chalcocite,	50
Chalcophanite,	75
Chalcopyrite,	15
Chalk,	05
Chert or Buhrstone,	05
Chloanthite,	1 50
Chlorastrolite, per oz., 50c.	
Chlorite,	05
Chloritoid (Masonite),	50
Chlorophyllite, N. H.,	15
Chondrodite,	1 50
Chromite,	10
Chrysoberyl, per oz., 2.00.	
Chrysocolla,	1 00
Chrysolite (Olivine),	15
Chrysotile,	35
Cinnabar, Cal.,	1 00

	Per lb. $ cts.
Cinnabar, Servia, 5%,	$0 20
Citrine,	1 00
Clausthalite, per oz., 75c.	
Clinochlore (Ripidolite),	50
Coal, Anthracite,	05
" Bituminous (iridescent),	05
" Cannel,	05
Cobaltite,	2 00
" 50%,	75
Coccolite,	05
Colemanite,	25
Columbite, Etta Mine, S. D.,	75
Copalite,	2 00
Copiapite,	50
Copper, native,	15
" glance,	50
" pyrites,	15
Coquimbite,	50
Cordierite, Norway,	1 50
Corundum, gray,	25
" good cleavage,	50
" deep blue,	1 00
" pink,	1 00
" Emery,	10
Covellite,	2 00
Croci lolite, unaltered,	1 00
" altered to Quartz ("Tiger Eye,")	25
Cryolite,	15
Cumengéite, xls., per gr., $1.00.	
Cuprite,	75
Cuprodescloizite,	50
Cyanite,	15
Cyrtolite and Fergusonite,	75
Damourite,	50
Danburite, per oz., 25c.	
Datolite, N. J.,	1 00
Descloizite,	1 00
" Cuprodescloizite,	50
Diadochite, per oz., 50c.	
Diallage,	25
Diaspore,	1 50
Diopside,	2 00
Dioptase, per oz., $3.00.	
Dolomite,	05
Domeykite, per oz., 50c.	
Dufrenite,	25
Dumortierite,	1 00
Dysanalyte, per oz., 25c.	
Dyscrasite, per oz., $2.50.	
Edenite,	10
Elaeolite,	25
Elaterite,	50
Electro Silicon, Nevada,	30
Embolite, N. S. W., per oz., $1.50.	
Emerald, xls., per oz., $1.00.	
Emery, Asia Minor or Mass.,	10
Emplectite, per oz., 35c.	
Enargite,	1 00
Enstatite (Bronzite),	25
Endlichite (V. As. Cl and Pb, pure massive),	75
Epidote, green,	15
Epidote, gray,	$0 35
Erythrite, per oz., 35c.	
Eudialyte,	3 00
Euxenite,	3 50
Feldspar,	05
Fergusonite,	2 00
Fibrolite,	10
Flexible Sandstone,	10
Flint,	05
Fluorite, green or white,	05
Fowlerite,	25
Franklinite,	10
Fuchsite,	50
Gadolinite,	3 00
Galena, cleavage,	05
Ganomalite,	75
Garnet, Almandite,	15
" Grossularite (white),	50
" Polyadelphite (Andradite),	15
" Pyrope (gem),	2 00
Garnierite,	50
Gibbsite,	25
Gilsonite,	35
Glauberite,	50
Glaucodot, per oz., 50c.	
Glauconite,	05
Gold-bearing Quartz, according to richness	1 00
" Pyrite, according to richness	10 00
Göthite,	30
Graphite,	15
Gray Copper,	50
Graphite,	60
Grossularite (white),	50
Guano,	20
Guitermannite,	50
Gummite, per oz., 50c.	
Gypsum, massive, Mich.,	05
" fibrous, N. Y.,	05
" Alabaster, Italy,	15
" Satin Spar, Eng.,	25
" Selenite, Utah,	05
Halite, granular,	05
" transparent cubes,	20
Halotrichite,	1 50
Hanksite,	1 00
Hauerite, per oz., 50c.	
Hausmannite, 75%, Sweden,	25
Heavy Spar, Conn.,	05
Hedyphane, per oz., 50c.	
Hematite, specular ore, Minn.,	05
" cryst., Elba,	20
" Kidney Ore, Eng.,	35
" Red Ochre, N. Y.,	05
Hercynite,	75
Hessite, per gr., 35c.	
Heulandite,	2 50
Hexagonite,	50
Hiddenite, per gr., 25c.	
Honestone,	10
Hornblende,	05
Horn Silver, per oz., 50c.	
Hyacinth, xls., per oz., $1.50.	
Hydromagnesite,	2 00

	Per lb. $ cts.
Hydrotalcite,	$1 25
Hypersthene,	35
Iceland Spar, Mo.,	1 00
" flawless, Iceland,	2 00
" large, flawless pieces for optical work, Iceland,	4 00
Idocrase,	15
Ilmenite, R. I. or Pa.,	20
Infusorial Earth, Va.,	15
" " Nevada,	30
Iolite, Chlorophyllite, N. H.,	15
" Cordierite, Norway,	1 50
Iridosmine, per gr., 20c.	
Iron, meteoric, Cañon Diablo, (Per oz., 40c; ½ lb., $2.00.)	3 20
" terrestrial, Greenland, (Per oz., 40c; ½ lb., $2.00.)	3 20
" Pyrites,	05
Itacolumyte,	10
Jadeite, New Zealand,	1 50
Jamesonite,	1 25
Jasper,	10
Jefferisite,	1 00
Kainite,	35
Kaolinite,	05
Keilhauite (Yttrotitanite),	1 00
Kieserite,	35
Labradorite, best, Labrador,	35
" New York,	05
Lapis-Lazuli (Lazurite),	1 00
Laumontite,	1 00
Lawsonite, xls., per oz., 25c.	
Lazulite,	2 50
Lazurite,	1 00
Lepidolite, Me.,	10
" Cal.,	05
Leucite, xls., per oz., 75c.	
Leucopyrite,	35
Limestone,	05
Limonite,	05
Lithographic Limestone,	05
Lodestone, good,	25
" strongest,	50
Löllingite (Leucopyrite),	35
Ludwigite,	50
Magnesite,	05
Magnetite, granular, N. Y.,	05
" Lodestone, good,	25
" " strongest,	50
Malachite,	25
Malacolite, xls.,	50
Manganite,	35
Marble,	05
Marcasite,	35
Margarite,	75
Margarodite,	50
Marl,	05
Masonite,	50
Meerschaum,	1 50
Melinophane, per oz., $1.50.	
Mellite, per oz., $2.50.	
Menaccanite, R. I. or Pa.,	20
Mercury,	75

	Per lb. $ cts.
Metacinnabarite, per oz., 75c.	
Mexican Onyx,	$0 15
Mica,	05
Microcline (Amazon Stone),	15
Microlite, per oz., $1.00.	
Milky Quartz,	05
Millerite, Germany or Pa.,	1 50
Mimetite, per oz., 50c.	
Mispickel,	15
Molybdenite, Can. or Sweden,	75
Molybdite, coating on rock,	35
Monazite, sand, N. C.,	20
Monticellite,	2 00
Moss Agate, Wyo.,	50
Muscovite, ordinary,	05
" Damourite,	50
" Fuchsite,	50
" Margarodite,	50
Nadorite,	2 00
Natrolite,	1 50
Natron,	1 25
Nephelite (Elaeolite),	25
Niccolite,	1 25
Nigrine, Ark.,	20
Northupite, xls., per gr., $1.00.	
Novaculite,	10
Obsidian,	20
Oligoclase, clear,	25
" Sunstone,	35
Olivenite, 10%,	75
Olivine,	15
Oölite,	05
Opal, common,	25
" Infusorial Earth, Va.,	15
" " " Nev.,	30
" Precious, Mex., per oz., 50c.	
" Wood Opal, Idaho,	25
Orangite, per oz., $1.50.	
Orpiment, Hungary,	1 00
Orthite,	15
Orthoclase, cleavage,	05
Ozocerite,	50
Pachnolite,	50
Pectolite,	1 00
Perovskite, per gr., 25c.	
Perthite,	35
Petalite,	50
Petrified (Jasperized) Wood,	15
Phenacite, per gr., 25c.	
Phosgenite,	75
Phosphate rock, Fla. or S. C.,	05
Phlogopite,	15
Phyllite, 10%,	05
Platinum, native, per gr., 50c.	
Plumbago,	15
Pollucite, per gr., 50c.	
Polyadelphite (Andradite),	25
Polycrase, per oz., 50c.	
Polyhalite,	50
Prehnite,	20
Prochlorite,	05
Proustite, per oz., $2.00.	
Psilomelane,	10

	Per lb. $ cts.
Pyrargyrite, per oz., $2.00.	
Pyrite, Spain,	$0 05
" sand, Va.,	05
Pyrolusite,	15
Pyrope (gem),	2 00
Pyrophyllite,	25
Pyropissite,	75
Pyromorphite,	1 00
Pyroxene, Augite, xls.,	50
" Coccolite,	05
" Diallage,	25
" Malacolite, xls.,	50
Pyrrhotite,	15
Quartz, Agate banded, Brazil,	25
" Amethyst, Ger.,	35
" Chalcedony,	25
" Chert or Buhrstone,	05
" Citrine,	1 00
" Flexible Sandstone (Itacolumite),	10
" Flint,	05
" Honestone,	10
" Jasper,	10
" Milky,	05
" Moss Agate, Wyo.,	50
" Petrified (Jasperized) Wood,	15
" Rock crystal, clear, Ark.,	20
" Rose, S. D.,	20
" Smoky, Colo.,	10
" Tiger-eye,	25
Quicksilver,	75
Rammelsbergite,	1 25
Realgar,	1 50
Rhodochrosite,	50
Rhodonite, Mass.,	25
" Fowlerite,	25
Ripidolite,	50
Rock Crystal, Ark.,	20
Roemerite,	2 00
Rose Quartz, S. D.,	20
Rubellite in Lepidolite,	25
" pure,	1 00
Ruby Silver, see Pyrargyrite and Proustite.	
Rutile, Nigrine, Ark.,	20
" Pa., red,	40
" " finest quality,	1 00
Sal-Ammoniac,	2 50
Salt. See Halite.	
Samarskite,	1 00
Sassolite,	50
Satin Spar, Eng.,	25
Scapolite (pink),	15
Scheelite,	75
Schorlomite,	50
Scolecite, N. J.,	1 50
Selenite, Utah,	05
Senarmontite, 50%,	75
Sepiolite (Meerschaum),	1 50
Serpentine, Pa.,	05
" Chrysotile,	35
" Williamsite,	10
Siderite,	$0 05
Silver in Quartz, } according	25
" bearing Galena, } to richness,	1 00
Silver Glance, per oz., $1.50.	
Sipylite, per oz., $1.50.	
Smaltite,	2 00
Smithsonite,	35
Smoky Quartz, Col.,	10
Soapstone,	05
Sodalite,	1 50
Soda Niter,	25
Sperrylite, per gr., $1.75.	
Sphalerite, cleavable,	10
" fibrous,	10
" white granular,	20
Spinel,	2 00
Spodumene,	10
" Hiddenite, per gr., 25c.	
Stannite,	1 00
Staurolite,	1 50
Steatite,	05
Stephanite, per oz., $1.00.	
Stibiconite, 25%,	50
Stibnite, Servia or Mex.,	20
Stilbite,	35
Stinkstone,	15
Stream Tin,	25
Strontianite,	25
Struvite, per gr., 25c.	
Succinite (Amber),	2 00
Sulphur, native,	20
Sunstone,	35
Sylvanite, per oz., $3.00.	
Sylvite,	50
Tachhydrite,	35
Talc, foliated,	25
" Steatite,	05
Tennantite, per oz., 35c.	
Tetradymite, per oz., $1.50.	
Tetrahedrite,	50
" Argentiferous,	75
Thaumasite,	1 00
Thenardite,	50
Thomsonite, 15%,	25
Thorite, per oz., $1.00.	
" Orangite, per oz., $1.50.	
Tiemanite, per oz., 75c.	
Tiger Eye,	25
Titanite,	20
Topaz,	25
Tourmaline, Rubellite in Lepidolite,	25
" " pure,	1 00
" black,	15
" brown,	15
Travertine,	05
Tremolite,	25
Triphylite,	60
Triplite, 25%,	25
Tripolite, Va.,	15
" Nev.,	30
Tscheffkinite,	75
Turquois,	50
Tysonite, per oz., $5.00.	

	Per lb. $ cts.
Uintahite,	$0 35
Ulexite,	75
Ullmannite,	1 25
Uraninite,	3 00
Uranophane (Uranotil), per oz., 50c.	
Valentinite,	75
Vanadinite, per oz., 25c. (Endlichite, V. As. Cl and Pb, pure massive, 75c. lb.)	
Vesuvianite,	15
Vivianite,	1 50
Wad,	20
Wagnerite, Kjerulfine,	2 00
Wavellite,	50
Wernerite, pink scapolite,	15
" yellow "	1 00
Willemite,	25
Williamsite,	$0 10
Witherite,	15
Wolframite,	35
Wollastonite,	35
Wood Opal, Idaho,	25
Wood Tin,	50
Wulfenite,	1 00
Wurtzilite,	1 00
Xenotime, per oz., 35c.	
Yttrotitanite,	1 00
Zinc Blende,	10
Zincite,	50
Zincite, with Franklinite, etc.,	15
Zinnwaldite,	75
Zircon,	35
" Hyacinth, per oz., $1.50.	
Zoisite, Mass.,	20
Zunyite, 10%,	50

IV.

METEORITES.

A list of other falls represented in our stock will be mailed on application. Correspondence is solicited with any one desiring to buy or sell.

Cañon Diablo, Arizona, Diamondiferous Meteoric Iron. Probably no other meteorite in the world's history has attracted such widespread and continued interest among scientists and others as the *Cañon Diablo.*

In March, 1891, a prospector found indications of what he supposed was a "mine of native iron." An assay of a sample of his ore gave rather confusing results, and a specimen was shown Dr. A. E. Foote for his opinion. He at once pronounced it meteoric. In June, 1891, he visited the locality, obtaining several large masses and some small pieces. It is believed that all of the iron has been gathered up in the thorough searches made by different parties since that time, including one under the auspices of the United States Geological Survey. The original sample (Plate XIII) was sent for analysis to Prof. G. A. Kœnig, who found in the mass; Diamonds, both black and white, iron carbide, sulphur, phosphorus, nickel, cobalt and silica. The following is taken from an account of Professor Kœnig's preliminary notice:

"In cutting the meteoric iron for study it was found to be of an extraordinary hardness, the section taking a day and a half, and a number of chisels having been destroyed in the process. When the mass, which on the exterior was not distinguished from other pieces of meteoric iron, was divided, it was found that the cutting apparatus had fortunately gone through a cavity. In the attempt to polish the surface so as to bring out the characteristic Widmannstätten figures, Dr. Kœnig received word that the emery wheel in use had been ruined.

"On examination, he then found that the exposed cavities contained Diamonds which cut through polished Corundum as easily as a knife will cut through Gypsum. The Diamonds exposed were small, black, and, of course, of but little commercial value, but, mineralogically, they are of the greatest interest, the presence of such in meteorites having been unknown until 1887, when two Russian mineralogists discovered traces of Diamonds in a meteoric mixture of olivine and bronzite. Granules of amorphous carbon were also found in the cavity, and a small quantity of this treated with acid had revealed a minute white diamond of one-half a millimeter, or about $\frac{1}{50}$ of an inch in diameter. In manipulation, unfortunately, this specimen was lost, but others will doubtless be obtained in the course of investigation. The minerals Troilite and Daubreelite were also found in the cavities. The proportion of nickel in the general mass is three per cent., and the speaker was

not as yet able to account for the extraordinary hardness apart from the presence of the Diamonds in the cavities."

The interesting character of the iron led other eminent chemists and high authorities on meteorites, to investigate it, all of whom have proved the presence of Diamonds, irregularly disseminated throughout different specimens examined. No Diamonds of any commercial value have been found; the white crystals were very minute, the larger ones being simply rough black Diamonds.

Dr. Foote called the attention of the scientific world to the discovery in a paper read by him before a meeting of the American Association for the Advancement of Science, held in Washington, D. C., August 20th, 1891. (*A New Locality for Meteoric Iron with a Preliminary Notice of the Discovery of Diamonds in the Iron.*) This announcement awakened much interest, which was reflected in both the popular and scientific journals, and more or less serious speculation was indulged in as to this new source of Diamonds. A most astounding, and yet when examined, reasonable suggestion, was that a small world, of perhaps one-eighth of a mile diameter, had struck Mother Earth at Cañon Diablo. This theory was announced by Prof. G. K. Gilbert, of the United States Geological Survey, in the discussion following the reading of Dr. Foote's paper. Later it was embodied in his Annual Address as President of the Geological Society of Washington, read December 11th, 1895. (*The Origin of Hypotheses, Illustrated by the Discussion of a Topographic Problem.*) Our thanks are due to the publishers of *Science* for the three illustrations used here.

Space permits our presenting only a brief outline of portions of the article, showing the exhaustive analysis to which Professor Gilbert subjected his hypothesis.

The iron, unquestionably meteoric, was found about Coon Butte, a saucer-shaped hollow, three-quarters of a mile broad, 600 feet deep, with its rim extending 150 feet above the level of the surrounding plain. Underlying the scanty soil of this plain are level beds of limestone. To any observer it was evident that a great disturbance had formed the crater, where before was only level plain. The crater was exactly such a one as may be made by throwing clay balls at a clay target, or by a steel projectile fired at steel plate. Strewn about the surrounding country were great masses of limestone (similar to the upturned broken edges of strata lining the sides of the crater), evidently thrown there by the disturbing force. Among these were found masses of metallic iron and a great quantity of iron oxide (altered from iron sulphide), of meteoric origin.

One hundred and sixty-five meteoric falls are recorded within the United States and irons have been found weighing many tons in different parts of the world. The entire absence of volcanic rock and the contour of the formation disproved any theory that this was a true crater. In connection with these established facts, the suggested analogy between a projectile and a huge meteorite invited investigation. By a careful topographic survey it was found that the volume of the rim and the *débris* would precisely fill the hollow, thus restoring the ancient plain, with no excess of material to account for the volume of the colliding star. This must have been at least one-eighth of a mile in diameter (estimated by experiments with clay targets). Moreover, a magnetic survey in the crater proved that no mass of iron was below the surface unless at a great depth.

So the hypothesis seemed entirely disproved.

Prof. Gilbert also reviews theories accounting for such isolated formations on the earth's surface as resemble this, and concludes that they are of different origin. Other explanations of the Cañon Diablo phenomenon are mentioned by him. The most important of these upsets his negative answer—which he based on the volumetric and magnetic tests. The majority of meteorites actually seen to fall are stones, and not solid irons. These stones have disseminated through them masses of metallic iron. According to the new explanation, the colliding star was a stony mass, while the irons actually found, weighing from less than an ounce to over 1,000 pounds, were but a small portion of its bulk, and if more are below the surface they are not sufficient to deflect the magnetic needle. As before mentioned, quantities of Limonite (supposed to have formed part of the stony mass) were found near the crater. Answering the volumetric test, it is assumed that so great a body, coming with frightful velocity, might by the force of the collision condense the rocks in its path, literally piercing the earth's crust, and leaving little behind to indicate its volume.

So to-day the question is still open: Was it a coincidence that the meteorites were found about this non-volcanic crater, and if so, what caused the latter phenomenon?

We still have a number of small complete Cañon Diablo irons, from less than an ounce to ten ounces, priced at about 30c. per oz. 25c. to $2.75

The same, brightly polished on one side and etched if desired, 50c. to $1.25 more. The polishing is costly on account of their extreme hardness, due undoubtedly to the presence of minute Diamonds. 3 to 10 oz. $2.00 to $4.00

In addition to some slightly larger masses, the following are offered at prices lower than asked for any other recorded fall. A rare opportunity for museums or collectors to secure an object of great interest.

No. 1. One of the largest found. Weight, 835 pounds. About 25x25x10 in. Shows pitted surface well and has several holes, completely perforating the mass at the edges. $175

No. 2. Shown in Plate XII. Weight, 201 pounds. About 19x10x7 in. This is the original mass found and described by Dr. Foote. It is of neat shape and finely marked. Three perforations. $75

No. 3. End section of a large mass. Weight, 35 pounds. About 12x7x3 in. This is a handsome shelf specimen, brightly polished on 12x7 face, showing Daubreelite. $40

Limonite, The oxidized portion of the meteorite. Pieces 1½ to 4 in. 15c. to 75c.

Sacramento Mountains (N. M.) Meteoric Iron. (W. M. Foote *Am. Jour. Sci.*, Jan., 1897. *Note on a New Meteorite from the Sacramento Mountains, Eddy County, New Mexico.*) This mass of iron is believed to be the meteor seen to fall at this place in 1876. No fragments could be found and the specimen appeared to be complete, weighing when found, 522 pounds. After purchasing it, the two ends were sawn off, forming a base about 10x3 in., the top measuring about 14x4 in. It is a level etched surface, showing a large Troilite nodule and the perfect crystallization of the iron (see XI). This characteristic octahedral crystallization is plainly exhibited on the fractured edges. The two deep round pits, 4 to 5 in. diameter, constitute a curious feature. The exterior is covered with the peculiar "thumb-marks," common in meteoric irons.

Analysis of a metallic sample gave: Iron, 91.39; Nickel, 7.86; Cobalt, .52=99.77.

The sawing was easily accomplished, the iron being quite soft. Its comparative softness and crystallization, would alone distinguish it from Cañon Diablo iron. The main mass, weighing 414 pounds, shown in Plate XII, and also the slab sawn from the top, are for sale. This complete section weighs 6 pounds 2 ounces, measures about 4x14 in. with uniform thickness of ⅝ in.; polished level on both sides, showing one Troilite nodule and a perforation at the edge.

Greenland Terrestrial Native Iron. Described on page 36, under New Arrivals.

V.

GEMS AND POLISHED SPECIMENS.

Gems.

The business of supplying universities and students with minerals for scientific investigation, demands a careful selection of high-class material and absolute accuracy in classifying and labeling. In our gem department equal precaution has been taken to insure against the errors so common among buyers, as well as dealers, and genuineness and correct naming are guaranteed. There are numerous misleading terms, such as "Topaz," applied to the yellow and smoky varieties of quartz, and "Ruby" to garnet and spinel. The following list shows the relation of the various popular names to the true ones. All the commonly used gem-stones are mentioned, and the different varieties or colors in which certain mineral species occur in gem-quality, are also noted.

An idea of proportionate sizes may be gained from the following approximate measurements: A 4 carat diamond measures about $\frac{3}{8}$ inch across; 2 ct., $\frac{5}{16}$ in.; 1 ct., $\frac{1}{4}$ in.; $\frac{1}{2}$ ct., $\frac{3}{16}$ in.; $\frac{1}{4}$ ct., $\frac{5}{32}$ in.; $\frac{1}{8}$ ct., $\frac{1}{8}$ in. In high priced stones the rate per carat increases with the size. The prices per carat, given opposite each name, are for stones of fairly good to fine quality.

(Gems will be sent on approval to those known to us, or furnishing references.)

	Per Carat.
Alexandrite (Chrysoberyl),	$30.00 to $90.00
Almandite (Garnet),	.50 " 1.50
Amber,	.15 " .35
Amethyst (Quartz),	.50 " 1.50
" Oriental (dark color),	3.50 " 15.00
Aquamarine (Beryl),	.75 " 6.00
Asteriated Sapphire,	2.00 " 8.00
Balas Ruby (Spinel),	10.00 " 30.00
Beryl, Golden, Aquamarine (pale green), Emerald (deep green).	
Cairngorm Stone (Q'rtz),	.15 " .50
Carbuncle (Garnet cut *en cabochon*),	.75 " 2.50
Cat's Eye (Chrysoberyl),	5.00 " 15.00
" (Quartz),	.15 " .50
Chrysoberyl, pale green, pale yellow, dark green (Alexandrite), Cat's Eye (*en cabochon*),	3.00 " 9.00
Chrysolite,	6.00 " 10.00
Citrine (Quartz) "Yellow Topaz,"	.10 " .40
Corundum, varieties:—Blue Sapphire, Asteriated or Star Sapphire, Montana Sapphire (different colors), Ruby.	
Diamond,	$50.00 to $100.00
Emerald (Beryl),	60.00 " 150.00
Fire Opal,	.75 " 4.00
Garnet, varieties:—Almandite, Carbuncle (cut *en cabochon*), Pyrope and Ruby.	
Hyacinth (Zircon),	2.00 " 3.50
Indicolite (Tourmaline),	3.00 " 8.00
Jargon (Zircon),	3.00 " 6.00
Moonstone (Oligoclase),	.50 " 1.00
Olivine (Chrysolite),	9.00 " 16.00
Opal, Australian,	1.50 " 12.00
" Mexican,	.50 " 4.00
" Fire,	.75 " 4.00
Peridot (Tourmaline),	1.50 " 3.00
Prehnite (*en cabochon*),	.50
Pyrope (Garnet),	.50 " 1.50
Quartz, varieties:—Rock Crystal (clear, colorless), Cairngorm (smoky), Citrine (yellow), Amethyst, Cat's Eye.	
Rock Crystal (Quartz),	.15 " .50

	Per Carat.		Per Carat.
Rubellite (Tourmaline),	$3.00 to $8.00	Topaz, "smoky" (Cairngorm stone),	$0.15 to $0.50
Ruby (Corundum, true Ruby),	24.00 " 80.00	Tourmaline,	2.00 " 8.00
" Spinel,	8.00 " 35.00	varieties:—Indicolite (dark blue), Peridot (yellowish green), Rubellite (pink).	
" Garnet,	.50 " 1.50		
Sapphire (Corundum),	5.00 " 20.00		
Spinel, Ruby,	8.00 " 35.00		
Topaz, clear, colorless and yellow,	.75 " 2.25	Turquois,	1.50 " 6.00
" "yellow" (Citrine),	.10 " .40	Zircon,	2.00 " 6.00
		varieties:—Hyacinth or Jacinth (red), Jargon (smoky).	

Polished Specimens.

For collectors and museums. Suitable for paperweights and ornamental purposes. The lowest price indicates a nice small piece; the highest, something extra fine and showy for the cabinet.

Back and edges show the natural rough surface unless otherwise noted.

Especial attention is called to the great beauty and novelty of the Opalized wood.

Agate, banded,	$0.10 to $3.00	Heliotrope (Bloodstone),	$0.35 to $1.00
" bull's eye,	.25 " 1.00	Hematite,	.35 " .50
" moss,	.15 " 2.50	Hornblende,	.35 " .75
Amber,	.75 " 2.50	Hypersthene,	1.00 " 4.00
Amethyst,	.35 " 1.50	Iceland Spar, clear, colorless rhomb polished on all sides (Iceland),	2.50 " 5.00
Amphibole,	.35 " .75		
Andalusite,	.35 " 2.00		
Aventurine Feldspar,	1.00 " 3.50	Iceland Spar, Amethystine, clear rhomb polished on all sides (Mo.),	2.00 " 3.50
Azurite and Malachite,	.50 " 3.50		
Baltimorite,	1.00 " 2.00	Iron, meteoric, diamondiferous (Arizona),	1.00 " 5.00
Barite, stalactite section,	.75 " 2.00		
Bloodstone,	.35 " 1.00	Iron, terrestrial (Greenland),	1.00 " 5.00
Blue Quartz,	.35 " 3.00	(Iron is either brightly polished, or etched to show crystalline structure.)	
Calcite, varieties:—Iceland Spar, Marbles, Mexican Onyx, Oölite, Stalactite and Stalagmite, Travertine.			
Carnelian,	.10 " .50	Jadeite,	.35 " 13.50
Cassiterite,	.15 " .75	(Jade is a term applied to this and other minerals.)	
Chalcedony,	.10 " 1.50		
Copalite (fossil amber), containing insects,	.50 " 2.00	Jasper,	.10 " 1.00
		Jasperized Wood,	.25 " 5.00
Crocidolite altered to Quartz,	.10 " 3.50	Labradorite,	.25 " 3.00
Deweylite,	.25 " 1.00	Lapis Lazuli, Lazurite,	.10 " 5.00
Dumortierite,	.75 " 2.00	Malachite, Arizona,	.25 " 2.00
Flêches d'Amour,	.50 " 9.00	" Russia,	.25 " 5.00
Fluorite,	.25 " 2.00	" and Azurite,	.50 " 3.50
Garnet, pink,	.50 " 3.00	Marble (various),	.25 " 1.50
" Almandite (large crystal, polished on 12 faces),	4.00 " 7.00	Meteoric Iron, diamondiferous,	1.00 " 5.00
Gold in Quartz,	2.00 " 4.00	Microcline, Amazon Stone,	.75 " 2.00
Göthite in Quartz,	.50 " 3.00	" Chatoyant,	.50 " 5.00
Graphic Granite,	.25 " .75	Moonstone,	.10 " .75
Grossularite,	.50 " 3.00	Moss Agate,	.50 " 2.50

Oligoclase, varieties: — Moonstone, Sunstone.			
Onyx (Quartz),	$0.25	to	$0.75
" Mexican (Calcite),	.25	"	2.00
Oölite (Quartz),	1.00	"	2.00
" (Calcite),	.50	"	1.00
Opal-Agate,	.50	"	1.50
" green, mottled with brown-red,	.50	"	5.00
" precious,	.75	"	5.00
Opalized Wood,	.75	"	12.00
Perthite,	.50	"	2.00
Petrified Wood. (See Jasperized and Opalized.)			
Picrolite,	.50	"	1.00
Pudding Stone (Quartz),	.50	"	1.25
Quartz, varieties:—Agate, Amethyst, Bloodstone, Blue (Sapphire), Carnelian, Chalcedony, containing Rutile, containing Göthite, Heliotrope, Jasper, Jasperized Wood, Moss Agate, Rock Crystal, Rose, Sard, Sardonyx, Smoky.			
Rock Crystal, Japanese ball,	$0.50	to	$45.00
Rhodonite,	.25	"	2.50
Rose Quartz,	.50	"	2.00
Rutilated Quartz,	.50	"	9.00
Sapphire Quartz,	.35	"	3.00
Sard,	.10	"	.25
Sardonyx,	.10	"	.25
Serpentine,	.25	"	1.50
" Verd-Antique,	.25	"	2.00
" Williamsite,	.25	"	1.50
Smithsonite,	.25	"	1.50
Sodalite,	.75	"	3.00
Sphalerite and Galena,	1.00	"	2.00
Stalactite and Stalagmite,	.25	"	1.50
Succinite (Amber),	.75	"	1.50
Sunstone,	1.00	"	3.50
Thomsonite,	.25	"	1.50
Thulite (Pink Zoisite),	.10	"	1.50
"Tiger Eye,"	.10	"	3.50
Travertine,	.50	"	2.00
Turquois in rock,	.25	"	3.50
Variscite,	1.00	"	8.00
Verd-Antique,	.25	"	2.00
Williamsite,	.25	"	1.50
Wood Opal,	.75	"	12.00
Zoisite, Thulite,	.10	"	1.50

FLAT PAPERWEIGHTS AND CUBES.

In two sizes; beveled edges and nicely polished on all sides.

Opalized Wood, $2.50 to $3.50.

Banded Agate, red and white, $2.00 to $3.00.

Moss Agate, green or black, $2.00 to $3.00.

"Tiger Eye" (Crocidolite altered to Quartz), $2.00 and $2.50.

Serpentine var. Verde-Antique, 75 cts. to $2.00.

We do polishing work to order. Cost averages about 15 cents per square inch. Less for large specimens.

CRYSTAL PAPERWEIGHTS.

The following are selected from over one thousand minerals as being inexpensive, natural crystallizations of unusual beauty, and making very handsome ornaments. They are mentioned in the order of their relative attractiveness. Specimens neatly shaped for paperweights of about 2x3 inches, are worth from 25 cts. to 75 cts. each, according to crystallization. Specimens about 3x4 inches cost 75 cts. to $1.50.

Tourmaline var. Rubellite. Slender pink crystals in a lavender Lepidolite rock, from San Diego Co., California.

Quartz var. Rock Crystal. Group of bright, clear crystals. (See illustration.) From near Hot Springs, Arkansas.

Fluorite or "Fluor Spar." Group of purple crystals, clear and of cubic form. From Cumberland, England.

Hematite or "Specular Iron Ore." Masses of brilliant coal-black crystals. From the Island of Elba.

VI.

BOOKS ON MINERALOGY AND GEOLOGY.

The following brief list of books embraces most of the advanced and elementary works on general mineralogy and geology which are in use at the present time.

New copies of all are kept in stock, and can be mailed on receipt of order. Postage or expressage to be paid by purchaser.

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"	"	"	"	"	$3\frac{1}{2}$ to 5	in.	"	"	1.20
Two	"	"	"	round,	$1\frac{3}{4}$ to $2\frac{1}{4}$	in.	"	"	0.60

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$\frac{7}{8}$ in. flat end.	$2\frac{1}{2}$ in.	$2.25	$0.40
$\frac{3}{4}$ " " "	2 "	1.75	0.30
$\frac{5}{8}$ " rounded end.	$1\frac{3}{4}$ "	1.75	0.30
$\frac{1}{2}$ " " "	$1\frac{3}{4}$ "	1.50	0.25
$\frac{3}{8}$ " " "	$2\frac{1}{4}$ "	1.25	0.20
$\frac{3}{8}$ " " "	$1\frac{1}{8}$ "	1.00	0.15
$\frac{1}{4}$ " " "	$1\frac{5}{8}$ "	1.00	0.15
$\frac{3}{16}$ " " "	$1\frac{5}{8}$ "	1.00	0.15

Glass Bottles.

Prices include corks.

Size.	Price per 100.	Price each, less than 100.
1 oz.	$2.40	$0.03
2 oz.	2.80	0.03½
4 oz.	4.00	0.05
6 oz.	4.80	0.06

Glass-Stoppered Bottles.

Wide mouth; iron mold; clear flint glass.

Size.	Price per 100.	Price each, less than 100.
1 oz.	$6.40	$0.08
2 oz.	8.40	0.10½
4 oz.	9.60	0.12
6 oz.	10.80	0.13½

Printed Mineral Labels.

Printed on good heavy paper, as shown on Plate IX. Giving species name, varietal or common name, chemical composition in words and symbols, crystallization and locality. The number in Dana's *System of Mineralogy* (sixth edition) is given for reference and for convenience in arranging the specimens of a collection. Labels of all the common, and a large number of the rare species and varieties are kept in stock. Important and well-known localities are represented. It makes a very neat label for either drawer or open cabinet, and adds much to the general tone of a collection. Size, 2¾x1¾ in. Price of different labels, 50 cts. per 100, or 1 ct. each.

Blank Mineral Labels.

Printed on heavy writing paper, size same as above, with neat border and either three or four dotted lines. 75 cts. per 1,000, or 15 cts. per 100.

Number Sheets.

Large, from 1 to 600 } 4 cts. per sheet, or 25 cts. per dozen sheets.
Small, from 1 to 4,000 }

Paste.

The best in the market, for attaching labels or mending specimens. Can be evaporated to any thickness. Dries quickly and will not peel or crack. 5 cts. per bottle.

Wax.

In black sticks, for mounting crystals, 25 cts. each.

Mineralogists' Hammers.

According to the approved pattern. One end of head is rectangular; the other a knife edge, parallel to the handle. Best steel, specially tempered for breaking the hardest rocks. Price includes handles. For large work, 2½ and 2 lbs., $1.00; preferred sizes, 1½ and 1 lbs., 75 cts.; for trimming small specimens and for use in blowpipe work, ½ and ¼ lb., 50 cts. Per dozen, 20% less.

Chisels.

Ordinary sizes, 5 to 8 in. long, 35 cts. to 50 cts. Sizes, 3 and 3½ in. long are specially made for developing specimens. Knife edges and points. 30 cts. each.

Improved Mineral Trimmer.

Description on application, ... price, $35.00

Pocket Lenses.

Achromatic Triplet.—Fine quality, nickeled case. Good definition and flat field. Preferred size, 1 in. focus, giving power of about ten diameters. Same, with ¾ in. focus, power of about fourteen diameters. $4.00.

Hasting's New Aplanatic Triplet.—A high quality lens for accurate mineralogical work. 1½ in. focus, 6.7 diameters. Preferred size, 1 in. focus, 10 diameters. $7.00.

New Aplanatic Magnifier.—A cheaply made glass, but equal in many respects to the more expensive triplet lenses. Gives a large and perfectly flat field; bright and of good definition, without spherical or chromatic aberration. $1.50.

Coddington Lens.—Nickeled case, 1 in. focus, $1.75; ¾ in. focus, $1.50.

Ordinary Pocket Glass.—Hard rubber case, oval shape. 1 lens, 1 in. diameter, 35 cts.; 1½ in. diameter, 55 cts.; 2 lenses, 1⅝ in diameter, 65 cts.; 2 lenses, 1⅞ in. diameter, 90 cts.

Hand Goniometer.

Improved pattern. Brass semicircle, graduated in degrees. Two sliding arms are adjustable from the same screw at centre. Price, in leather case, $6.75.

Celluloid Crystal Models.

Series of Six Crystal Models in transparent celluloid (averaging 4 inches longest diameter), exhibiting the six different systems of crystallization, and showing various derivative forms by means of internal crystals.

These models exhibit the six systems of crystallization to which the innumerable forms occurring in nature may be reduced. Also, the number and positions of the internal axes of crystallization, the basis upon which the systems are formed.

They are made in two styles: Set A. The internal crystals are made of white transparent celluloid, with red borders. Set B. The internal crystals are made of red transparent celluloid. Price of the six models, in case, $16.00.

Hardwood Crystal Models.

A. 213 models, according to Prof. Dr. P. Groth. Made of selected pear wood, each 5 c. m. diameter. This set is most complete, showing all the principal forms and combinations covered in a regular course in Crystallography. Price, duty free to institutions, $205.00.

B. 108 models, according to Prof. Dr. Rose, each about 5 c. m. diameter. Includes the principal combinations of the six systems of crystallization. In case, with list for reference, $22.00.

C. 34 models selected from the preceding and showing most important forms. Case and list accompany. $10.00.

Models of Precious Stones.

Set of 24 imitations of precious stones cut from crystal glass, colored to resemble the true stones. In velvet-lined box. $17.25.

Metals.

A. The fifteen principal metals in sticks 8 c. m. x 45 m. m. (Gold is represented by aluminium-bronze.) In neat case. $22.00.

B. A set of fourteen metals, according to Prof. Dr. R. Arendt. Cut in thin strips of equal width and thickness, their specific gravity being shown by their varying lengths. Attached to a card. Two sizes, $9.00 and $14.00.

Portable Blowpipe Set.

Complete outfit for prospectors or others desiring to determine minerals in the field, by the dry or wet methods. Includes apparatus and reagents recommended by Prof. S. L. Penfield in his revised edition of Brush's *Determinative Mineralogy and Blowpipe Analysis.*

Blowpipe, 2 lamps, 1 tube of alcohol, 1 tube of oil, platinum forceps and wire, glass tubing, beakers, funnel, test-tubes and watch glasses, diamond mortar, agate mortar, hammer, pliers, file, magnet, casserole, filter and test papers, 4 dry reagents in 1-oz. bottles, 10 dry reagents (tin, zinc, bone-ash, etc.) in small vials, 9 essential wet reagents in 1-oz. bottles. All in neat, serviceable fittings compactly arranged in compartments of special cloth-covered case. Complete, measures 6 in. wide, 6 in. high, and 14 in. long. $21.00.

VIII.

ALPHABETICAL INDEX AND PRICE LIST.

THE INDEX includes the names of all known minerals: (1) distinct species, (2) varieties, (3) sub-species, (4) common synonyms. The numbers preceding the names refer to their order in Dana's Classification. Where "r" follows the name it is a sub-species, *related* to or near the species, the number of which precedes the name; when followed by "v," it is a *variety;* followed by "s," a *synonym;* followed by "ap.," a name in the *appendix*, nearest the number. "H" designates *Hydrocarbons;* "N," minerals, generally *new*, described in the Supplement.

PRICES are quoted on minerals in stock at the present time, or expected within a few weeks. Generally, those not on hand are exceedingly rare and almost unknown in any but the largest collections or museums. The prices given are for good typical examples; the lowest for study specimens of small size, the highest for choice cabinet specimens. Fragments for beginners can usually be furnished at less than the minimum figure; often very fine specimens are sold higher than the maximum.

A price list of this kind necessarily fails to give an idea as to quality. Many are well crystallized and of showy appearance, but a large proportion, especially among the rarer kinds, are only found in small crystals or massive. An illustrated account of important minerals will be found under "I. New Minerals." Lists of crystals, pseudomorphs and microscopic mounts are given under "II. Collections, Division D." III. Minerals sold by weight for use in chemical and technical laboratories. V. Gems and precious stones.

		$		$
744.	Abraum salts, r., . .			
447.	Acadialite, v., . . .	.10	to	1.50
57.	Acanthite, ...	.75	"	4.00
819.	Achrematite, r., . .			
426.	Achroite, v., ...	.50	"	2.50
366.	Achtaragdite, r., . .			
326.	Acmite, ...	.15	"	3.00
338.	Actinolite, v., . . .	.05	"	.75
563.	Adamite, ...	.25	"	3.00
458.	Adamsite, v., . . .			
N.	Adelite, ...			
524.	Adelpholite, r., . .			
447.	Adipite, v., ...			
313.	Adularia, v., ...	.25	"	2.50
445.	Ædelforsite, v., . .			
326.	Ægirite, s., ...	.15	"	3.00
N.	Aërinite, ...			
532.	Æschynite, ...	.25	"	7.00
458.	Agalmatolite, r., . .	.25	"	1.00
210.	Agate, v., ...	.10	"	2.00
210.	Agate-Jasper, v., . .	.25	"	1.50
306.	Agnesite, r., ...			
373.	Agricolite, ...			
N.	Aguilarite, ...	.50	to	10.00
138.	Aikinite, ...	.25	"	2.00
248.	Ainalite, r., ...			
H.	Ajkite, ...			
391.	Åkermanite, r., . .			
63.	Alabandite, ...	.15	"	3.00
746.	Alabaster, v., . . .	.05	"	.35
325.	Alalite, v., ...	.25	"	1.00
118.	Alaskaite, s., . . .	1.00	"	3.00
H.	Albertite, ...	.10	"	.50
435.	Albine, v., ...	.25	"	1.00
316.	Albite, ...	.05	"	3.00
242.	Alexandrite, v., . .	.50	"	2.50
38.	Algodonite, ...			
483A.	Alipite, r., ...			
45.	Alisonite, r., ...			
578.	Allactite, ...	.25	"	2.50
335.	Allagite, r., ...			
409.	Allanite, ...	.10	"	1.00
9.	Allemontite, ...	.25	"	2.50
102.	Alloclasite, ...	.25	"	2.00

719. Allomorphite, v., . $ $
24. Allopalladium, . . .
498. Allophane, ...15 to 1.25
509. Allophite, ap., . . .
544. Alluaudite, r., . . .
370. Almandite, v., ...05 " 3.00
510. Alshedite, v., ...25 " 2.50
278. Alstonite, s., ...25 " 2.50
46. Altaite, ...50 " 2.50
769. Alum, Iron, s., ...25 " 1.00
764. " Native, s., . . .15 " .75
Alums, 764–770, . .
736. Alumian, ...
791. Aluminite, ...25 " .75
212. Alumocalcite, v., . .
800. Alumstone, s., ...10 " .75
800. Alunite, ...10 " .75
775. Alunogen, ...25 " .75
462B. Alurgite, r., ...
394. Alvite, r., ...50 " 3.50
17. Amalgam, ...25 " 3.00
13. " Gold, r., .
17. " Silver, s., . .25 " 3.00
787. Amarantite, ...50 " 2.50
315. Amazonite, v., . . .
315. Amazon stone, v., . .10 " 7.50
H. Amber, Succinite, . .25 " 3.00
559. Amblygonite, ...10 " 1.00
324. Amblystegite, v., . .
H. Ambrite, ...50 " 1.50
H. Ambrosine, ...
470. Amesite, r., ...
210. Amethyst, v., ...15 " 4.00
338. Amianthus, s. v., . . .05 " 1.25
675. Ammiolite, r., . . . 1.00 " 3.00
338. Amphibole, ...05 " 7.50
611. Amphithalite, r., .
450. Analcite, ...25 " 2.00
252. Anatase, s., ...75 " 5.00
398. Andalusite, ...10 " 2.00
318. Andesine, ...05 " .50
318. Andesite, s., ...05 " .50
N. Andorite, ...
370. Andradite, v., ...15 " 1.50
656. Andrewsite, r., . .
721. Anglesite, ...25 " 10.00
722. Anhydrite, ...05 " .75
35. Animikite, r., . . .
271A. Ankerite, ...15 " 2.00
602. Annabergite, ...25 " 1.50
530. Ånnerödite, ...50 " 2.50
462B. Annite, s., ...25 " 1.00
N. Anomalite, ...25 " 1.00
462. Anomite, v., ...
320. Anorthite, ...25 " 2.00
315A. Anorthoclase, . . .
325. Anthochroite, v., .
337. Anthophyllite, . . .10 " .75
505. Anthosiderite, r., .
H. Anthracite, ...05 " .25
H. Anthracoxenite, . .
H. Anthraxolite, . . .
481. Antigorite, v., . . .
509. Antillite, ap., . . .
9. Antimonial Arsenic, r.,
221. Antimonial Ocher, s., $ .25 to $ .75
144. " Red Silver, s., .50 " 5.00
10. Antimony, ...25 " 3.00
9. " Arsenical, s., ...25 " 2.50
28. " Glance, s., .15 " 10.00
741. Antlerite, r., ...
N. Antochroite, . . .
175. Antozonite, v., . . .
455. Antrimolite, v., . .
789. Apatelite, r., ...25 " 1.50
549. Apatite, ...10 " 4.00
270. Aphrite, v., ...
426. Aphrizite, v., . . .
481. Aphrodite, r., . . .25 " 1.50
477. Aphrosiderite, . . .25 " 1.25
717. Aphthitalite, . . .
770. Apjöhnite, ...
370. Aplome, v., ...
435. Apophyllite, . . .10 " 6.00
509. Aquacreptite, ap., .10 " .75
344. Aquamarine, v., . .25 " 3.50
223. Aqueous Vapor, s., .
277. Aragonite, ...15 " 5.00
H Aragotite, ...
717. Arcanite, r., ...
509. Arctolite, ap., . . .
418. Ardennite, ...25 " 1.50
675. Arequipite, r., . . .
342. Arfvedsonite, . . .10 " 1.00
45. Argentiferous Galena, v., ...25 " 1.00
270. Argentine, v., ...10 " .50
42. Argentite, ...25 " 8.00
56. Argentopyrite, r., .
163. Argyrodite, ... 2.00 " 5.00
56. Argyropyrite, r., . .
253. Arkansite, v., . . .10 " 3.50
780A. Arnimite, ...
768. Aromite, r., ...
17. Arquerite, v., . . .25 " 2.00
535. Arrhenite, ap., . . .
35. Arsenargentite, r., .
8. Arsenic, ...25 " 1.75
9. " Antimonial, r.,
213. " White, s., . .
87. Arsenical Cobalt, s., .10 " 5.00
71. " Nickel, s., .25 " 3.00
98. " Pyrites, s., .10 " 1.50
145. " Red Silver, s., . .50 " 5.00
35. " Silver, r., .
582. Arseniopleite, . . .50 " 2.50
577. Arseniosiderite, . .25 " 2.50
8. Arsenolamprite, r., .
213. Arsenolite, ...
98. Arsenopyrite, . . .10 " 1.50
108. Arsenotellurite, ap.,
338. Asbeferrite, v., . .
338. Asbestus, v., . . .05 " 1.25
481. Asbestus, v., . . .10 " .75
210. Asbestus in Quartz, v., .50 " 3.00
269. Asbolite, r., ...10 " 1.00
N. Ascharite, ...

211.	Asmanite, r.,	$		$	
549.	Asparagus-stone, v.,	.50	to	2.00	
504.	Asperolite, v.,				
H.	Asphaltum,	.05	"	.25	
462A.	Aspidolite, r.,				
210.	Asteriated Quartz, s.,				
231.	" Sapphire, s.,	.50	"	3.00	
325.	Asteroite, v.,				
N.	Astochite,	.15	"	2.00	
758.	Astrakanite, v.,	.75	"	2.50	
514.	Astrophyllite,	.10	"	1.50	
193.	Atacamite,	.25	"	3.50	
584.	Atelestite,	1.00	"	3.00	
193.	Atelite, r.,				
389.	Atheriastite, r.,				
289.	Atlasite, r.,				
669.	Atopite,				
645.	Attacolite, r.,				
394.	Auerbachite, r.,				
395.	Auerlite, r.,				
645.	Augelite, r.,				
325.	Augite, v.,	.10	"	2.50	
353.	Auralite, r.,				
290.	Aurichalcite,	.50	"	3.00	
236.	Automolite, v.,	.25	"	3.00	
661.	Autunite,	.25	"	3.00	
458.	Avalite, v.,	.50	"	1.50	
506.	Avasite, r.,				
317.	Aventurine Feldspar, s. v.,	.25	"	3.00	
210.	Aventurine Quartz, v.,	.50	"	1.50	
25.	Awaruite, v.,				
410.	Axinite,	.25	"	7.50	
394.	Azorite, v.,				
289.	Azurite,	.10	"	6.00	
210.	Babel-quartz, v.,	.35	"	1.50	
336.	Babingtonite,	.25	"	1.50	
N.	Baddeleyite,				
409.	Bagrationite, v.,				
325.	Baikalite, v.,				
H.	Baikerinite,				
234.	Balas Ruby, s. v.,	.25	"	3.00	
479.	Baltimorite, r.,	.10	"	1.00	
509.	Balvraidite, ap.,				
399.	Bamlite, v.,				
210.	Banded Agate, v.,	.10	"	2.00	
675.	Barcenite, r.,	.25	"	2.00	
509.	Barettite, ap.,				
270.	Baricalcite, v.,				
719.	Barite,	.05	"	3.00	
342A.	Barkevikite,				
83.	Barnhardtite, r.,	.35	"	1.50	
610.	Barrandite,	.35	"	1.50	
320.	Barsowite, r.,				
801.	Bartholomite, r.,				
430.	Barylite, ap.,	1.00	"	5.00	
354.	Barysilite,				
462.	Barytbiotite, v.,				
719.	Barytes, s.,	.10	"	3.00	
282.	Barytocalcite,	.25	"	1.50	
720.	Barytocelestite, v.,				
210.	Basanite, v.,	.15	"	.50	
233.	Basanomelan, v.,				
N.	Basiliite,				
324.	Bastite, r.,	$		$	
285.	Bastnäsite,	.50	to	3.50	
462.	Bastonite, r.,	.50	"	1.50	
H.	Bathvillite,				
374.	Batrachite, v.,				
261.	Bauxite,	.05	"	.35	
629.	Bayldonite,	.75	"	3.00	
394.	Beccarite, v.,				
709.	Bechilite,	.15	"	1.50	
155.	Beegerite,				
210.	Beekite, v.,	.05	"	.35	
820.	Belonesite,				
507.	Bementite,	.50	"	4.00	
648.	Beraunite,	.25	"	1.50	
H.	Berengelite,				
338.	Bergamaskite, v.,				
453.	Bergmannite, v.,				
479.	Berlauite, r.,				
645.	Berlinite, r.,				
N.	Bernardinite,				
269.	Bernonite, ap.,				
473.	Berthierine, r.,				
119.	Berthierite,	.50	"	2.00	
422.	Bertrandite,	.50	"	6.00	
344.	Beryl,	.10	"	3.50	
546.	Beryllonite,	.25	"	2.50	
49.	Berzelianite,	1.50	"	5.00	
538.	Berzeliite,	.50	"	3.50	
680.	Beudantite,	.25	"	2.50	
407.	Beustite, v.,	.50	"	2.50	
76.	Beyrichite,				
509.	Bhreckite, ap.,				
754.	Bieberite,				
H.	Bielzite,				
497.	Biharite, r.,				
670.	Bindheimite,				
123.	Binnite,	1.00	"	4.00	
320.	Biotine, v.,				
462.	Biotite,	.05	"	3.00	
270.	Bird's-eye Marble, v.,	.10	"	.75	
197.	Bischofite,	.25	"	1.00	
217.	Bismite,	.50	"	2.50	
11.	Bismuth,	.25	"	3.00	
13.	Bismuth-gold, v.,				
29.	Bismuthinite,	.25	"	3.00	
217.	Bismuth Ocher, s.,	.50	"	2.50	
306.	Bismutite,	.25	"	2.00	
430.	Bismutoferrite, ap.,				
283.	Bismutosphärite,				
H.	Bitumen, s., Elaterite,	.10	"	.50	
H.	Bituminous Coal,	.05	"	.25	
N.	Bixbyite,	.25	"	6.00	
230.	Black Copper, s.,	.25	"	3.50	
338.	" Hornblende, v.,	.05	"	5.00	
58.	" Jack, s.,	.10	"	2.00	
2.	" Lead, s.,	.10	"	1.50	
270.	" Marble, v.,	.05	"	.25	
462.	" Mica, s.,	.05	"	3.00	
210.	" Tourmaline in Quartz, v.,	.15	"	.50	
45.	Bleischweif, v.,				
58.	Blende, s.,	.10	"	2.00	
N.	Bliabergite,				
758.	Blödite,	.75	"	2.50	

535.	Blomstrandite, ap.,	$	$
210.	Blood-stone, v.,	.25 to	1.50
597.	Blue Iron Earth, s.,	.15 "	4.00
N.	Blueite,		
755.	Blue Vitriol, s.,	.10 "	1.50
599.	Bobierrite,		
409.	Bodenite, r.,		
269.	Bog Manganese, r.,	.10 "	1.50
259.	" Ore, v.,	.05 "	.35
493.	Bole, v.,	.10 "	.50
N.	Boléite,	.25 "	8.00
108.	Bolivianite, ap.,		
29.	Bolivite, r.,		
719.	Bologna Stone, v.,	.25 "	1.00
375.	Boltonite, v.,	.10 "	.75
H.	Bombiccite,	.25 "	1.50
698.	Boracite,	.25 "	3.00
707.	Borax,	.15 "	.75
169.	Bordosite, r.,		
265.	Boric Acid, s.,	.35 "	1.50
653.	Borickite,	.50 "	2.00
78.	Bornite,	.15 "	2.00
708.	Boronatrocalcite, s.,		
1.	Bort, v.,	.50 "	5.00
798.	Botryogen,	.25 "	1.50
401.	Botryolite, v.,		
139.	Boulangerite,	.25 "	2.00
751.	Bourbolite, r.,		
136.	Bournonite,	.35 "	3.50
759.	Boussingaultite,		
481.	Bowenite, v.,	.15 "	.75
566.	Brackebuschite,	.50 "	1.50
465.	Brandisite, v.,	.25 "	1.50
591.	Brandtite,	.50 "	5.00
247.	Braunite,	.15 "	2.00
509.	Bravaisite, ap.,		
N.	Brazilite,		
270.	Breccia Marble, v.,	.15 "	.75
338.	Breislakite, v.,	.50 "	5.00
72.	Breithauptite,	.35 "	2.50
272.	Breunnerite, s.,	.25 "	1.50
439.	Brewsterite,	.50 "	3.00
N.	Brewsterlinite,		
3.	Brimstone, s.,	.15 "	2.00
153.	Brittle Silver, s.,	.25 "	6.00
740.	Brochantite,	.25 "	2.00
711.	Bröggerite, v.,		
278.	Bromlite,	.25 "	2.50
171.	Bromyrite,	1.00 "	5.00
132.	Brongniardite,		
323.	Bronzite, v.,	.05 "	.50
253.	Brookite,	.10 "	3.50
259.	Brown Clay-iron-stone, v.,	.05 "	.35
H.	Brown Coal,	.05 "	.25
259.	Brown Hematite, s.,	.05 "	1.50
257.	Brown Iron-ore, s.,	.10 "	3.00
259.	Brown Iron-stone, s.,	.05 "	1.50
271.	Brown Spar, s.,	.15 "	2.00
262.	Brucite,	.25 "	6.00
H.	Brücknerellite,		
175.	Bruiachite, r.,		
270.	Brunnerite, v.,		
618.	Brushite,		
H.	Bucaramangite,		
409.	Bucklandite, v.,	$	$
210.	Buhrstone, v.,	.05 to	.25
227.	Bunsenite,		
N.	Burmite,		
770.	Bushmanite, r.,		
173.	Bustamentite, r.,		
335.	Bustamite, v.,		
H.	Byerite,		
338.	Byssolite, v.,	.10 "	1.50
603.	Cabrerite,		
212.	Cacholong, v.,	.25 "	1.50
392.	Cacoclasite, r.,	.15 "	2.00
647.	Cacoxenite,	.25 "	2.00
210.	Cairngorm Stone, s.,	.05 "	3.00
H.	Caking (coking) Coal,	.05 "	.25
423.	Calamine,	.10 "	4.00
105.	Calaverite, r.,	.50 "	4.00
719.	Calcareobarite, v.,		
270.	Calcareous Marl, v.,		
720.	Calciocelestite, v.,		
652.	Calcioferrite,		
395.	Calciothorite, r.,		
565.	Calciovolborthite,		
270.	Calcite,	.05 "	6.00
228.	Calcozincite, v.,	.10 "	3.00
270.	Calc Spar, s.,	05 "	6.00
270.	Calc Tufa, v.,	.05 "	.50
370.	Calderite, v.,		
739.	Caledonite,	.50 "	3.00
612.	Callainite,		
164.	Calomel,	1.00 "	15.00
719.	Calstronbarite, v.,		
551.	Campylite, v.,	.25 "	3.50
325.	Canaanite, v.,		
360.	Cancrinite,	.10 "	1.00
N.	Canfieldite,		
H.	Cannel Coal,	.05 "	.25
67.	Cantonite, r.,		
445.	Caporcianite, v.,		
210.	Capped Quartz, v.,	.50 "	1.50
347.	Cappelenite,		
729.	Caracolite,		
1.	Carbonado, v.,	2.00 "	10.00
370.	Carbuncle, s. v.,	.50 "	3.00
541.	Carminite,		
201.	Carnallite,	.15 "	.50
210.	Carnelian, v.,	.10 "	.50
498.	Carolathine, r.,	.25 "	1.50
424.	Carpholite,	.25 "	2.00
790.	Carphosiderite,		
82.	Carrollite,		
540.	Caryinite,	1.00 "	3.00
349.	Caryocerite,		
508.	Caryopilite,	.25 "	3.00
248.	Cassiterite,	.10 "	2.50
783.	Castanite,		
510.	Castellite, r.,		
78.	Castillite, r.,	1.00 "	2.50
310.	Castorite, v.,	.50 "	3.00
N.	Caswellite,	.10 "	1.50
346.	Catapleiite,	.50 "	2.50
458.	Cataspilite, r.,	.10 "	.50
500.	Catlinite, ap.,	.05 "	.25
210.	Cat's-Eye, v.,	.25 "	2.50

242.	Cat's-Eye,	$ .25	to	$5.00
210.	Cavernous Quartz, v.,	.25	"	2.00
361.	Cavolinite, r.,	.25	"	1.00
489.	Celadonite,	.25	"	1.00
N.	Celestialite,			
720.	Celestite,	.05	"	10.00
719.	Celestobarite, v.,			
501.	Cenosite,	.75	"	2.50
435.	Centrallassite, r.,			
169.	Cerargyrite,	.25	"	6.00
353.	Cerasite, v.,			
425.	Cerite,	.15	"	2.00
481.	Cerolite, r.,			
281.	Cerussite,	.10	"	6.00
221.	Cervantite,	.15	"	.75
234.	Ceylonite, v.,	.10	"	1.00
447.	Chabazite,	.10	"	4.00
755.	Chalcanthite,	.10	"	1.50
210.	Chalcedony, v.,	.10	"	2.00
54.	Chalcocite,	.15	"	6.00
474.	Chalcodite, v.,	.15	"	1.25
811.	Chalcomenite,			
435.	Chalcomorphite, r.,			
268.	Chalcophanite,	.10	"	3.00
636.	Chalcophyllite,	.25	"	2.00
83.	Chalcopyrite,	.10	"	3.00
81.	Chalcopyrrhotite, r.,			
656.	Chalcosiderite,	.25	"	3.50
117.	Chalcostibite,			
224.	Chalcotrichite, v.,	.25	"	4.00
456.	Chalilite, v.,			
270.	Chalk, v.,	.05	"	.25
484.	" French, s. v.,	.05	"	.35
273.	Chalybite, s.,	.05	"	3.00
25.	Chalypite, r.,			
473.	Chamosite, r.,	.25	"	1.00
H.	Chemawinite,			
655.	Chenevixite,	.50	"	2.00
550.	Cherokine, v.,			
210.	Chert, v.,	.05	"	.25
289.	Chessylite, s.,	.25	"	4.00
315.	Chesterlite, v.,	.15	"	1.50
398.	Chiastolite, v.,	.10	"	2.00
649.	Childrenite,	.25	"	3.50
567.	Chileite, r.,			
40.	Chilenite,	.50	"	3.00
683.	Chili Saltpeter, s.,	.10	"	.75
492.	China Clay, s.,	.05	"	.35
184.	Chiolite,	.50	"	1.50
111.	Chiviatite,			
323.	Chladnite, v.,			
88.	Chloanthite,	.25	"	3.00
179.	Chloralluminite, r.,			
549.	Chlor-apatite, v.,			
N.	Chloroarsenian,			
457.	Chlorastrolite, ap.,	.10	"	5.00
	Chlorite Group, 468–479.			
210.	Chloritic Quartz, v.,	.25	"	3.00
466.	Chloritoid,	.10	"	.75
176.	Chloromagnesite,			
328.	Chloromelanite, v.,			
505.	Chloropal,	.10	"	.75
479.	Chlorophaeite, r.,	.10	"	.75
353.	Chlorophyllite, r.,	.10	"	.50
234.	Chlorospinel, v.,			
729.	Chlorothionite, r.,	$		$
712.	Chlorothorite, r.,			
596.	Chlorotile, r.			
184.	Chodneffite, r.,			
572.	Chondrarsenite,			
415.	Chondrodite,	.15	to	3.50
N.	Chondrostibian,			
509.	Chonicrite, ap.,			
H.	Chrismatite,			
320.	Christianite, v.,			
58.	Christophite, v.,			
325.	Chrome-diopside, v.,			
500.	Chrome Ocher, ap.,			
462.	Chromglimmer, v.,			
241.	Chromic Iron, s.,	.05	"	.35
241.	Chromite,	.05	"	.35
370.	Chromium Garnet (s. Uvarovite), v.,	.50	"	2.00
241.	Chrompicotite, v.,			
242.	Chrysoberyl,	.25	"	2.50
504.	Chrysocolla,	.10	"	2.00
376.	Chrysolite,	.05	"	.50
210.	Chrysoprase, v.,	.50	"	2.50
481.	Chrysotile, v.,	.10	"	.75
606.	Churchite,			
495.	Cimolite,	.15	"	.75
66.	Cinnabar,	.15	"	7.50
370.	Cinnamon-stone, v.,	.15	"	5.00
676.	Ciplyte, r.,			
576.	Cirrolite,			
210.	Citrine (Yellow Quartz), v.,	.25	"	1.25
158.	Clarite, r.,			
215.	Claudetite,			
47.	Clausthalite,	.50	"	3.00
232.	Clay Iron-stone, v.,	.05	"	.35
149.	Clayite, r.,			
316.	Cleavelandite, v.,	.05	"	.50
58.	Cleiophane, v.,	.10	"	.50
711.	Cleveite, v.,	1.00	"	3.50
1.	Cliftonite, r.,			
468.	Clinochlore,	.10	"	3.50
571.	Clinoclasite,	.25	"	2.00
801.	Clinocrocite, r.,			
416.	Clinohumite,	.50	"	2.50
801.	Clinophæite, r.,			
465.	Clintonite, v.,	.15	"	2.00
H.	Cloustonite,			
450.	Cluthalite, r.,			
H.	Coal, Anthracite,	.05	"	.25
H.	" Bituminous,	.05	"	.25
H.	" Brown,	.05	"	.25
H.	" Caking,	.05	"	.25
H.	" Cannel,	.05	"	.25
H.	" Mineral,	.05	"	.25
H.	" Non-Caking,	.05	"	.25
601.	Cobalt Bloom, s.,	.25	"	3.00
89.	" Glance, s.,	.10	"	5.00
89.	Cobaltite,	.10	"	5.00
811.	Cobaltomenite, r.,			
79.	Cobalt Pyrites, s.,	.50	"	3.00
173.	Coccinite, r.,			
325.	Coccolite, v.,	.05	"	.50
96.	Cockscomb Pyrites, v.,	.10	"	1.50

645.	Cœruleolactite, r.,	$ .10	to $ .75
704.	Colemanite,	.10	" 7.00
586.	Collophanite,	.50	" 2.00
499.	Collyrite,	.50	" 1.50
370.	Colophonite, v.,	.25	" 1.00
62.	Coloradoite,	.35	" 2.50
525.	Columbite,	.15	" 7.50
212.	Common Opal, v.,	.10	" 3.00
37.	Condurrite, v.,	.50	" 2.00
628.	Conichalcite,	.25	" 3.00
486.	Connarite,		
731.	Connellite,	1.00	" 4.00
460.	Cookeite, r.,	.10	" 1.50
H.	Copalite,	.15	" .75
H.	Copalite cont. insects,	.25	" 2.00
784.	Copiapite,	.25	" 2.00
15.	Copper,	.15	" 2.00
108.	Copper and Silver Sulphide, ap.,		
751.	Copperas, s.,	.15	" 2.00
54.	Copper Glance, s.,	.15	" 6.00
504.	Copper Pitch-blende, v.,		
83.	Copper Pyrites, s.,	.10	" 3.00
659.	Copper-Uranite, s.,	.25	" 3.50
772.	Coquimbite,	.15	" 2.00
711.	Coracite, r.,		
353.	Cordierite, s.,	.10	" 3.50
634.	Cornwallite,		
675.	Coronguite, r.,		
470.	Corundophilite,	.15	" 1.00
231.	Corundum,	.10	" 3.00
91.	Corynite,	.50	" 2.50
128.	Cosalite,	.50	" 2.50
459.	Cossaite, v.,		
343.	Cossyrite, v.,		
180.	Cotunnite,	.50	" 2.50
388.	Couseranite, v.,	.15	" .75
67.	Covellite,	.50	" 2.50
N.	Craigtonite,		
245.	Crednerite,		
233.	Crichtonite, v.,		
211.	Cristobalite, r.,		
341.	Crocidolite,	.10	" 1.00
725.	Crocoisite, s.,	.50	" 5.00
725.	Crocoite,	.50	" 5.00
472.	Cronstedtite,	.25	" 5.00
53.	Crookesite,		
N.	Crossite,		
98.	Crucite, r.,		
183.	Cryolite,	.10	" 2.00
461.	Cryophyllite, v.,	.50	" 2.00
553.	Cryphiolite, r.,		
185.	Cryptohalite, r.,		
708.	Cryptomorphite, r.,		
N.	Cryptovalite,	1.00	" 7.50
81.	Cubanite,	.10	" 1.00
480.	Culsageeite, v.,		
N.	Cumengéite,	.25	" 7.50
338.	Cummingtonite, v.,	.25	" 1.50
14.	Cupriferous silver, v.,		
224.	Cuprite,	.10	" 7.50
549.	Cupro-apatite, v.,		
112.	Cuprobismutite,		
N.	Cuprocalcite,		
N.	Cuprocassiterite,	$	$
564.	Cuprodescloizite, v.,	.25	to 2.50
N.	Cuproiodargyrite,		
754.	Cupromagnesite, r.,		
45.	Cuproplumbite, r.,		
815.	Cuprotungstite,		
413.	Cuspidine,		
400.	Cyanite,	.10	" 1.50
504.	Cyanochalcite, v.,		
761.	Cyanochroite,		
781.	Cyanotrichite,	.50	" 3.00
327.	Cymatolite, r.,		
393.	Cyprine, v.,	.25	" 1.25
795.	Cyprusite,		
394.	Cyrtolite, r.,	.25	" 1.50
676.	Dahllite,	.50	" 1.50
57.	Daleminzite, r.,		
458.	Damourite, v.,	.10	" .75
98.	Danaite, v.,		
367.	Danalite,	.50	" 1.50
396.	Danburite,	.25	" 2.00
338.	Dannemorite, v.,	.75	" 2.00
471.	Daphnite,		
689.	Darapskite,		
401.	Datolite,	.15	" 3.00
194.	Daubréeite,		
80.	Daubreelite,		
344.	Davidsonite, v.,		
190.	Daviesite,		
509.	Davreuxite, ap.,	.50	" 2.00
361.	Davyne, r.,	.25	" 2.50
293.	Dawsonite,	.25	" 1.50
564.	Dechenite, r.,		
506.	Degeröite, v.,		
269.	Delafossite, ap.,		
648.	Delavauxite, r.,	.25	" 1.50
478.	Delessite,	.15	" .75
370.	Demantoid, v.,		
504.	Demidovite, v.,		
N.	Derbylite,		
509.	Dermatin, ap.,		
483A.	De Saulesite, r.,	.50	" 3.00
564.	Descloizite,	.25	" 5.00
443.	Desmine, s.,	.10	" 3.00
677.	Destinezite, v.,	.25	" 2.00
482.	Deweylite,	.15	" .75
476.	Diabantite,	.10	" .75
324.	Diaclasite, r.,		
677.	Diadochite,	.25	" 2.00
325.	Diallage, v.,	.10	" 1.00
274.	Diallogite, s.,	.15	" 5.00
1.	Diamond,	.50	" 10.00
134.	Diaphorite,	1.00	" 3.00
256.	Diaspore,	.25	" 10.00
338.	Diastatite, v.,		
	Diatomaceous Earth,	.05	" .35
588.	Dickinsonite,		
458.	Didymite, v.,		
771.	Dietrichite,	.50	" 2.00
N.	Dietzeite,		
569.	Dihydrite,	.50	" 3.50
716.	Dihydro-thenardite, r.,		
504.	Dillenburgite, v.,		

499.	Dillnite, r., ...	$	$
27.	Dimorphite, r., . .		
H.	Dinite, ...		
325.	Diopside, v., ...	.15	to 2.50
383.	Dioptase, ...	1.00	" 15.00
388.	Dipyre, v., ...	.25	" 1.50
400.	Disthene, s., ...	.10	" 1.50
585.	Dittmarite, r., . . .		
112.	Dognacskaite, r., . .		
270.	Dog-tooth Spar, v., .	.10	" 6.00
738.	Dolerophanite, . . .		
271.	Dolomite, ...	.05	" 2.50
37.	Domeykite, ...	.50	" 3.50
H.	Dopplerite, ...		
270.	Doubly Refracting Spar, s., ...	.15	" 4.00
200.	Douglasite, ...		
719.	Dreelite, r., ...		
210.	Drusy Quartz, v., . .	.05	" .25
275.	Dry-bone, s. v., . .	.10	" .75
83.	Ducktownite, r., . .		
480.	Dudleyite, r., . . .	.25	" 1.00
573.	Dufrenite, ...	.15	" 1.50
127.	Dufrenoysite, . . .	.25	" 3.00
479.	Dumasite, r., . . .		
427.	Dumortierite, . . .	.15	" 3.00
768.	Dumreicherite, r., .		
509.	Duporthite, ap., . .		
558.	Durangite, ...	.50	" 2.00
810.	Durdenite, ...		
141.	Dürfeldtite, r., . . .		
H.	Duxite, ...	.10	" .75
519.	Dysanalyte, ...	.05	" 2.00
35.	Dyscrasite, ...	.50	" 3.50
236.	Dysluite, v., ...	.25	" 6.00
H.	Dysodile, ...		
335.	Dyssnite, r., ...		
458.	Dysyntribite, r., . .		
673.	Ecdemite, ...	.25	" 3.50
329.	Edelforsite, v., . . .		
338.	Edenite, v., ...	.10	" .75
452.	Edingtonite, ...	2.00	" 12.00
25.	Edmonsonite, r., . .		
719.	Eggonite, r., ...		
570.	Ehlite, r., ...		
500.	Ehrenbergit, ap., .		
262.	Eisenbrucite, r., . .		
233.	Eisenrosen, v. (or v. 232), ...	.50	" 5.00
479.	Ekmannite, r., . . .		
357.	Elæolite, v., ...	.10	" 1.00
H.	Elastic Bitumen (s., Elaterite), ...	.10	" .50
H.	Elaterite, ...	.10	" .50
13.	Electrum, v., . . .	1.00	" 6.00
648.	Eleonorite, v., . . .	.50	" 2.00
N.	Elfstorpite, ...		
453.	Ellagite, r., ...		
N.	Ellonite, ...		
183.	Elpasolite, r., . . .		
N.	Elpidite, ...		
N.	Elroquite, ...	.10	" 1.50
170.	Embolite, ...	.25	" 3.00
344.	Emerald, v., ...	.25	" 3.50
303.	Emerald, Nickel, s.,	$ .25	to $1.50
231.	Emery, v., ...	.10	" .50
809.	Emmonsite, ...		
116.	Emplectite, ...	.50	" 2.00
158.	Enargite, ...	.15	" 2.50
270.	Encrinal Marble, v., ...	.10	" .50
551.	Endlichite, r., . . .	.25	" 9.00
323.	Enstatite, ...	.05	" 3.50
805.	Enysite, r., ...	.25	" 2.00
819.	Eosite, r., ...		
650.	Eosphorite, ...		
509.	Ephesite, ap., . . .		
161.	Epiboulangerite, . .		
479.	Epichlorite, r., . .		
N.	Epididymite, . . .		
407.	Epidote, ...	.10	" 5.00
210.	Epidote in Quartz, v., ...	1.00	" 2.00
162.	Epigenite, ...		
379.	Epigenite, r., . . .		
585.	Epiglaubite, r., . .		
479.	Epiphanite, r., . .		
549.	Epiphosphorite, r.,		
457.	Episphärite, ap., . .		
440.	Epistilbite, ...	.50	" 8.00
748.	Epsomite, ...	.25	" 2.00
748.	Epsom Salt, s., . .	.25	" 2.00
350.	Erdmannite, r., . .		
402.	" r., . .		
N.	Erilite, ...		
568.	"	.25	" 2.00
386.	Ersbyite, v., . . .		
78.	Erubescite, s., . . .	.15	" 2.00
795.	Erusibite, r., . . .		
601.	Erythrite, ...	.25	" 3.00
193.	Erythrocalcite, r., .		
199.	Erythrosiderite, . .		
69.	Erythrozincite, r., .		
407.	Escherite, v., . . .		
370.	Essonite, v., ...	.15	" 5.00
803.	Ettringite, ...		
51.	Eucairite, ...		
632.	Euchroite, ...	.25	" 2.50
403.	Euclase, ...	2.00	" 15.00
345.	Eucolite, v., ...	.25	" 3.50
510.	Eucolite-titanite, v.,		
395.	Eucrasite, r., . . .		
358.	Eucryptite, ...		
345.	Eudialyte, ...	.25	" 3.50
312.	Eudidymite, . . .	.25	" 5.00
450.	Eudnophite, v., . .		
462.	Eukamptite, r., . .		
368.	Eulytite, ...	.50	" 3.00
253.	Eumanite, r., . . .		
H.	Euosmite, ...		
459.	Euphyllite, r., . . .		
549.	Eupyrchroite, v., .	.25	" 1.25
479.	Euralite, r., ...		
564.	Eusynchite, r., . .		
450.	Euthallite, v., . . .		
534.	Euxenite, ...	.25	" 5.00
645.	Evansite, ...	.25	" 2.00
743.	Exanthalose, r., . .		
210.	Eye-Agate, v., . . .	.25	" 1.50

148. Fahlerz, s., ... $ .15 to $5.00
353. Fahlunite, r., . . .
592. Fairfieldite, ...
N. Falkenhaynite, . .
159. Famatinite, ...
453. Fargite, v., ...
456. Farœlite, v., ...
325. Fassaite, v., ...25 " 1.50
451. Faujasite, ...25 " 1.50
750. Fauserite, r., . . .
377. Fayalite, ...
130. Feather Ore, s., . . .25 " 3.50
Feldspar Group, 313-320, . .
316. " Soda, s., . .05 " 3.00
793. Felsōbanyite, . . .
812. Ferberite, r., . . .
523. Fergusonite, ...25 " 2.00
376. Ferrite, r., ...
270. Ferrocalcite, v., . . .35 " 4.00
89. Ferrocobaltite, v., .
526A. Ferro-ilmenite, r., .
777. Ferronatrite, . . .
N. Ferrosilicate, . . .
583. Ferrostibian, r., . .
810. Ferrotellurite, r., .
233. Ferrozincite, r., . .
210. Ferruginous Quartz, v., ...10 " .50
719. Fetid Barite, v., . . .10 " .50
270. " Calcite, v., . .
505. Fettbol, v., ...
788. Fibroferrite, ...25 " 2.00
399. Fibrolite, v., ...10 " .75
H. Fichtelite, ...25 " 1.00
191. Fiedlerite, ... 2.00 " 5.00
149. Fieldite, r., ...
589. Fillowite, ...
212. Fiorite, v., ...25 " 2.00
212. Fire-opal, v., ...10 " 3.00
640. Fischerite, ...
250. Flêches d'Amour, s., .25 " 9.00
210. Flexible Sandstone, v., ...15 " 1.50
580. Flinkite, ... 1.00 " 5.00
210. Flint, v., ...05 " .25
212. Float-stone, v., . .
277. Flos-ferri, v., ...15 " 5.00
203. Fluellite, ...
196. Fluocerite, ...75 " 5.00
175. Fluor, s., ...05 " 3.50
549. Fluor-apatite, v., . . .05 " 4.00
175. Fluorite, ...05 " 3.50
175. Fluor spar, s., ...05 " 3.50
195. Fluosiderite, r., . .
N. Folgerite, ...
106. Foliated Tellurium, s., ...75 " 5.00
270. Fontainebleau Limestone, v., ...50 " 4.00
Fool's gold, s., 83, 85, .10 " 3.50
N. Footeite, ...10 " 3.50
625. Forbesite, ...
509. Forchammerite, ap.,
212. Forcherite, v., ...50 " 1.50
443. Foresite, r., ... $ .50 to $2.50
375. Forsterite, ...35 " 1.00
210. Fortification Agate, v., ...10 " 2.00
N. Fouquéite, ...
335. Fowlerite, v., ...10 " 10.00
549. Francolite, v., ...25 " 4.00
N. Frankeite, ...
708. Franklandite, r., . .
239. Franklinite, ...10 " 7.50
149. Fredricite, v., . . .
148. Freibergite, s., ...25 " 1.00
135. Freieslebenite, . . . 2.00 " 5.00
484. French Chalk, s.v., . .05 " .35
395. Freyalite, r., ...
384. Friedelite, ...50 " 3.50
56. Frieseite, v., ...
665. Fritzscheite, r., . .
458. Fuchsite, v., ... 10 " 1.25
N. Fuggerite, ...
500. Fuller's Earth, ap., .
325. Funkite, v., ...

389. Gabronite, r., . . .
404. Gadolinite, ...25 " 8.00
236. Gahnite, ...25 " 6.00
455. Galactite, v., ...
45. Galena, ...10 " 2.00
45. Galenite, s., ...10 " 2.00
118. Galenobismutite, . .35 " 2.00
338. Gamsigradite, v., . .
355. Ganomalite, ...25 " 3.50
N. Ganomatite, ...
432. Ganophyllite, ...75 " 2.00
370. Garnet, ...05 " 5.00
483A. Garnierite, ...10 " .75
297. Gay-lussite, ...15 " 5.00
207. Gearksutite, ...25 " 2.00
H. Gedanite, ...
337A. Gedrite, ...
392. Gehlenite, ...25 " 2.00
N. Geikielite, ... 1.00 " 4.00
483. Genthite, ...15 " 1.50
H. Geocerellite, ...
H. Geocerite, ...
152. Geocronite, ...
H. Geomyricite, ...
688. Gerhardtite, ...
90. Gersdorffite, ...50 " 2.50
97. Geyerite, v., ...
212. Geyserite, v., ...25 " 2.00
264. Gibbsite, ...10 " .50
458. Gieseckite, r., ...25 " 5.00
458. Gigantolite, r., . . .
458. Gilbertite, v., ...50 " 2.00
506. Gillingite, r., ...
H. Gilsonite, s. Uintahite, ...15 " .75
509. Ginilsite, ap., . . .
212. Girasol, v., ...25 " 1.00
444. Gismondite, ...25 " 2.00
399. Glancespar, r., . . .
505. Glasurite, r., ...
718. Glauberite, ...15 " 3.50
743. Glauber Salt, s., . . .25 " 1.50

101.	Glaucodot,	$ .15 to $2.00
387.	Glaucolite, v.,	
490.	Glauconite,	.05 " .35
339.	Glaucophane,	.25 " 1.00
97.	Glaucopyrite, s.,	.15 " .50
H.	Glessite,	
376.	Glinkite, v.,	
648.	Globosite, r.,	
792.	Glockerite,	
452.	Glottalite, r.,	
448.	Gmelinite,	.25 " 5.00
13.	Gold,	.50 " 15.00
13.	Gold Amalgam, r.,	
344.	Golden Beryl, v.,	.50 " 5.00
344.	Goshenite, v.,	.25 " 1.50
749.	Goslarite,	.50 " 2.50
257.	Göthite,	.10 " 3.00
210.	Göthite in Quartz, v.,	.50 " 3.00
657.	Goyazite,	
H.	Grahamite,	.15 " .75
505.	Graminite, v.,	
211.	Granuline, r.,	
104.	Graphic Tellurium, s.,	.75 " 5.00
2.	Graphite,	.10 " 1.50
N.	Graphitite,	
2.	Graphitoid, r.,	
479.	Grastite, r.,	
148.	Gray Copper Ore, s.,	.15 " 5.00
68.	Greenockite,	.50 " 4.00
212.	Green-opal, v.,	.10 " 3.00
510.	Greenovite, v.,	.35 " 3.00
555.	Griphite, r.,	.25 " 2.00
469.	Grochauite, r.,	
448.	Groddeckite, r.,	.50 " 2.00
509.	Groppite, ap.,	
370.	Grossularite, v.,	.10 " 5.00
510.	Grothite, v.,	
75.	Grünaüite, r.,	
338.	Grünerite, v.,	
59.	Guadalcazarite, r.,	
30.	Guanajuatite,	1.00 " 3.00
585.	Guanapite, r.,	
549.	Guano, r.,	.10 " .35
742.	Guanovulite, r.,	
585.	Guanoxalate, r.,	
512.	Guarinite,	.50 " 1.50
110.	Guejarite,	
142.	Guitermanite,	.25 " 1.50
497.	Gümbelite, r.,	
712.	Gummite,	.25 " 3.00
175.	Gunnisonite, r.,	
H.	Guyaquillite,	
482.	Gymnite, s.,	.15 " .75
746.	Gypsum,	.05 " 4.00
434.	Gyrolite,	
206.	Hagemannite, r.,	.10 " .50
616.	Haidingerite,	
166.	Halite,	.10 " 1.50
480.	Hallite, r.,	.15 " 1.00
493.	Halloysite,	.10 " .50
769.	Halotrichite,	.15 " 1.00
696.	Hambergite,	
548.	Hamlinite,	
733.	Hanksite,	$.15 to $7.50
623.	Hannayite,	
442.	Harmotome,	.25 " 3.00
455.	Harringtonite, v.,	
54.	Harrisite, r.,	
412.	Harstigite,	
H.	Hartite,	.25 " 1.00
H.	Hatchettite,	
521.	Hatchettolite,	
N.	Hauchecornite,	
86.	Hauerite,	.25 " 5.00
462.	Haughtonite, v.,	
243.	Hausmannite,	.15 " 4.00
N.	Hautefeuillite,	
363.	Haüynite,	.25 " 5.00
447.	Haydenite, v.,	.25 " 2.00
709.	Hayesine, r.,	
210.	Haytorite, v.,	
719.	Heavy Spar, s.,	.05 " 3.00
325.	Hectorite, r.,	
325.	Hedenbergite, v.,	.25 " 5.00
552.	Hedyphane, r.,	.50 " 3.50
706.	Heintzite,	
N.	Heldburgite,	
H.	Helenite,	
210.	Heliotrope, v.,	.25 " 1.50
462B.	Helvetan, r.,	
366.	Helvite,	.25 " 2.00
627.	Hemafibrite,	
232.	Hematite,	.05 " 4.00
581.	Hematolite,	
46.	Henryite, r.,	
655.	Henwoodite, r.,	.50 " 3.50
66.	Hepatic Cinnabar, v.,	
235.	Hercynite,	.35 " 1.50
547.	Herderite,	1.00 " 7.00
526A.	Hermannolite, r.,	
780.	Herrengrundite,	.25 " 3.50
275.	Herrerite, v.,	
447.	Herschellite, v.,	.25 " 6.00
N.	Hessenbergite,	
43.	Hessite,	1.00 " 6.00
269.	Hetærolite, ap.,	.15 " 2.00
269.	Heterogenite, ap.,	
130.	Heteromorphite, v.,	.15 " .50
544.	Heterosite, r.,	
269.	Heubachite, ap.,	
438.	Heulandite,	.10 " 4.00
338.	Hexagonite, v.,	.10 " .75
302.	Hibbertite, r.,	
327.	Hiddenite, v.,	.25 " 3.50
531.	Hielmite,	.50 " 2.00
185.	Hieratite,	
338.	Hillängsite, v.,	.75 " 2.00
706.	Hintzeite, s.,	
334.	Hiortdahlite,	.50 " 2.00
H.	Hircite,	
506.	Hisingerite,	.25 " 1.25
270.	Hislopite, v.,	
N.	Hoeferite,	
600.	Hœrnesite,	
H.	Hofmannite,	
787.	Hohmannite, r.,	.50 " 2.50
83.	Homichlin, r.,	
402.	Homilite,	.75 " 2.50

587.	Hopeite,	$	$
74.	Horbachite, r.,	1.00 to	5.00
338.	Hornblende, s.v.,	.05 "	5.00
210.	Hornblende in Quartz, v.,	.25 "	1.00
169.	Hornsilver, s.,	.25 "	4.00
210.	Horn Stone (Chert), v.,	.05 "	.25
36.	Horsfordite,		
376.	Hortonolite, r.,		
266.	Houghite, r.,		
293.	Hovite, r.,		
N.	Howardite,		
701.	Howlite,	.25 "	1.50
166.	Huantajayite, r.,		
45.	Huascolite, r.,		
813.	Hübnerite,	.25 "	2.00
325.	Hudsonite, v.,		
479.	Hullite, r.,		
823.	Humboldtine,		
H.	Huminite,		
414.	Humite,	.50 "	2.50
H.	Humus acid,		
35.	Huntilite, r.,	.25 "	5.00
624.	Hureaulite,		
320.	Huronite, r.,		
500.	Hverlera, ap.,		
394.	Hyacinth, v.,	.25 "	3.00
212.	Hyalite, v.,	.25 "	2.00
314.	Hyalophane,		
376.	Hyalosiderite, v.,	.15 "	1.00
356.	Hyalotekite,		
264.	Hydrargillite, s.,		
269.	Hydrated Titanic Oxide, ap.,		
270.	Hydraulic Limestone, v.,	.05 "	.35
549.	Hydroapatite, r.,	.25 "	3.50
462.	Hydrobiotite, r.,		
710.	Hydroboracite,		
N.	Hydrobucholzite,		
N.	Hydrocalcite,		
	Hydrocarbons. Described at end of Dana classification.		
310.	Hydrocastorite, r.,		
292.	Hydrocerussite,		
298.	Hydroconite, r.,		
224.	Hydrocuprite, r.,	.10 "	1.00
724.	Hydrocyanite,		
302.	Hydrodolomite, r.,	.10 "	.75
185.	Hydrofluorite, r.,		
269.	Hydrofranklinite, ap.,		
301.	Hydrogiobertite,		
166.	Hydrohalite, r.,		
233.	Hydroilmenite, r.,		
300.	Hydromagnesite,	.15 "	1.00
457.	Hydronephelite,	.25 "	1.25
N.	Hydroniccite,		
212.	Hydrophane, v.,	.25 "	1.50
174.	Hydrophilite,		
481.	Hydrophite, r.,	.50 "	1.50
269.	Hydroplumbite, ap.,		
335.	Hydrorhodonite, r.,	.50 "	2.50
N.	Hydrosamarskite,		
509.	Hydrosilicite, ap.,	$	$
468A.	Hydrotalc, v.,		
266.	Hydrotalcite,	.10 to	1.00
379.	Hydrotephroite, r.,	1.00 "	3.50
519.	Hydrotitanite, r.,	.05 "	1.00
291.	Hydrozincite,	.25 "	1.50
458.	Hygrophilite, r.,		
324.	Hypersthene,	.15 "	4.00
430.	Hypochlorite, ap.,		
316.	Hyposclerite, v.,		
233.	Hystatite, v.,		
223.	Ice,		
270.	Iceland Spar, v.,	.15 "	4.00
N.	Iddingsite,		
393.	Idocrase, s.,	.10 "	3.00
H.	Idrialite,		
267.	Igelströmite, s.,	.50 "	1.50
378.	Igelströmite, v.,		
802.	Ignatievite, r.,		
774.	Ihlëite,		
747.	Ilesite,		
233.	Ilmenite,	.05 "	.75
250.	Ilmenorutile, v.,		
219.	Ilsemannite, r.,		
417.	Ilvaite,	.25 "	2.00
320.	Indianite, v.,		
426.	Indicolite, v.,	.25 "	10.00
431.	Inesite,	.50 "	3.00
212.	Infusorial Earth, v.,	.05 "	.35
172.	Iodobromite,		
173.	Iodyrite,	.75 "	6.00
353.	Iolite,	.10 "	3.50
H.	Ionite,		
21.	Iridium,		
22.	Iridosmine,	.20 "	2.00
241.	Irite, r.,		
25.	Iron,	.25 "	8.00
241.	" Chromic, s.,	.05 "	.35
237.	" Magnetic, s.,	.05 "	6.00
25.	" Meteoric, v.,	.25 "	8.00
85.	" Pyrites, s.,	.10 "	3.50
25.	" Terrestrial, v.,	.25 "	8.00
233.	" Titaniferous, s.,	.05 "	.75
751.	" Vitriol, s.,	.15 "	2.00
233.	Iserine, r.,		
250.	Iserite, r.,		
	Isinglass (Mica),		
626.	Isoclasite,		
N.	Isopyre,		
210.	Itacolumyte, s. v.,	.15 "	1.50
364.	Ittnerite, r.,		
371.	Ivaarite, r.,		
458.	Ivigtite, v.,	.10 "	.75
526A.	Ixiolite, r.,		
H.	Ixolyte,		
240.	Jacobsite,	.25 "	2.00
328.	Jadeite,	.25 "	4.00
70.	Jaipurite, r.,		
42.	Jalpaite, r.,		
130.	Jamesonite,	.25 "	3.50
394.	Jargon, v.,	1.00 "	4.00
801.	Jarosite,	.25 "	2.00
210.	Jasper, v.,	.10 "	1.00

210.	Jasperized Wood, v.,	$ .10	to	$5.00
212.	Jasp-opal, v.,	.15	"	.75
H.	Jaulingite,			
480.	Jefferisite,	.10	"	1.50
325.	Jeffersonite, v.,	.10	"	5.00
370.	Jelletite, v.,	.25	"	1.00
211.	Jenzschite, r.,			
692.	Jeremejevite,			
H.	Jet, v. Coal,	.10	"	.75
607.	Jogynaite, r.,			
806.	Johannite,	1.00	"	6.00
45.	Johnstonite, v.,			
515.	Johnstrupite,	.25	"	2.50
506.	Jollyte, r.,			
150.	Jordanite,	2.00	"	9.00
32.	Josëite,	.50	"	2.00
N.	Josephinite,			
727.	Jossaite, r.,			
338.	Kaersutite,			
730.	Kainite,	.25	"	1.50
705.	Kaliborite, r.,			
287.	Kalicine, r.,			
764.	Kalinite,	.15	"	.75
359.	Kaliophilite,			
360.	Kalk-cancrinite, r.,			
N.	Kallilite,			
N.	Kamarezite,			
468A.	Kämmererite, v.,	.25	"	1.50
108.	Kaneite, ap.,			
492.	Kaolin, s.,	.05	"	.75
492.	Kaolinite,	.05	"	.75
N.	Karamsinite,			
537.	Kårarfveite, r.,			
217.	Karelinite, r.,			
N.	Kauaiite,			
500.	Keffekilite, ap.,			
N.	Kehoeite,			
511.	Keilhauite,	.25	"	1.50
420.	Kentrolite,	.50	"	2.00
107.	Kermesite,	.50	"	2.50
480.	Kerrite, r.,			
811.	Kerstenite, r.,			
233.	Kibdelophane, v.,			
232.	Kidney Ore, v.,	.10	"	1.00
498.	Kieselaluminite, r.,			
744.	Kieserite,	.15	"	1.00
154.	Kilbrickenite,	.75	"	2.50
458.	Killinite, r.,			
338.	Kirwanite, r.,			
284.	Kischtimite, r.,			
553.	Kjerulfine, v.,	.15	"	2.50
124.	Klaprotholite,			
471.	Klementite, r.,	.50	"	1.50
335.	Klipsteinite, r.,			
378.	Knebelite,	.50	"	1.50
N.	Knopite,			
785.	Knoxvillite,			
131.	Kobellite,	.50	"	2.00
523.	Kochelite, r.,			
H.	Köflachite,			
338.	Koksharovite, v.,			
17.	Kongsbergite, v.,			
614.	Koninckite,	.50	"	2.00
H.	Könlite,			
520A.	Koppite,	.25	"	1.50
774.	Kornelite, r.,	$		$
429.	Kornerupine,			
468.	Kotschubeite, v.,	.50	to	2.50
604.	Köttigite,			
313.	Krablite, r.,			
233.	Kragerö Hematite, v.,			
H.	Krantzite,	.25	"	1.50
236.	Kreittonnite, v.,	.50	"	2.00
198.	Kremersite,			
105.	Krennerite,			
74.	Krœberite, r.,			
776.	Krohnkite,	.50	"	2.50
762.	Krugite, r.,			
429.	Kryptotil, r.,			
N.	Kulibinite,			
504.	Kupferblau, r.,			
337.	Kupfferite, v.,			
14.	Küstelite, v.,			
N.	Kylindrite,	.50	"	1.50
319.	Labradorite,	.10	"	2.50
702.	Lagonite,			
269.	Lampadite, r.,			
805.	Lamprophanite, r.,			
N.	Lamprostibian,			
737.	Lanarkite,	1.00	"	4.00
270.	Landscape Marble, s., v.,	.50	"	3.00
419.	Långbanite,	.50	"	3.50
779.	Langite,	.25	"	3.00
302.	Lansfordite,			
298.	Lanthanite,	.75	"	6.00
365.	Lapis-Lazuli, s.,	.10	"	5.00
703.	Larderellite,			
549.	Lasurapatite, v.,			
320.	Latrobite, v.,			
446.	Laubanite,			
445.	Laumontite,	.25	"	4.00
189.	Laurionite,	.35	"	3.00
94.	Laurite,			
N.	Lautarite,			
158.	Lautite, r.,			
596.	Lavendulan, r.,	.35	"	2.50
332.	Lavenite,	.50	"	2.50
325.	Lavrovite, v.,			
178.	Lawrencite,	1.00	"	3.00
N.	Lawsonite,	.25	"	10.00
574.	Lazulite,	.25	"	2.00
313.	Lazurfeldspar, v.,			
365.	Lazurite,	.10	"	5.00
18.	Lead,	.50	"	5.00
734.	Leadhillite,	.50	"	5.00
742.	Lecontite,			
510.	Lederite, v.,	.10	"	1.00
719.	Leedsite, r.,			
313.	Leelite, v.,	.50	"	2.00
50.	Lehrbachite,	1.00	"	3.00
509.	Leidyite, ap.,	.15	"	.75
480.	Lennilite, r.,	.10	"	.50
493.	Lenzinite, v.,	.25	"	.75
445.	Leonhardite, v.,	.25	"	1.50
N.	Leonite,			
257.	Lepidokrokite, s.,	.10	"	3.00
460.	Lepidolite,	.05	"	4.00
462B.	Lepidomelane,	.25	"	1.00
458.	Lepidomorphite, v.,			

		$		$
320.	Lepolite, v.,			
509.	Lesleyite, ap.,			
781.	Lettsomite, s.,	.50	to	3.00
325.	Leucaugite, v.,			
468.	Leuchtenbergite, v.,	.50	"	2.00
321.	Leucite,	.10	"	3.00
631.	Leucochalcite,	.50	"	2.00
435.	Leucocyclite, v.,			
H.	Leucopetrite,			
351.	Leucophanite,	.25	"	1.50
458.	Leucophyllite, v.,			
97.	Leucopyrite, v.,	.15	"	.50
509.	Leucotile, ap.,			
492.	Leverrierite, r.,			
59.	Leviglianite, r.,			
449.	Levynite,	.25	"	1.50
N.	Lewisite,			
562.	Libethenite,	.25	"	3.50
458.	Liebenerite, r.,	.15	"	1.00
308.	Liebigite,	.25	"	1.50
417.	Lievrite, s.,	.25	"	2.00
H.	Lignite,	.10	"	.75
510.	Ligurite, v.,			
140.	Lillianite,	.50	"	3.00
509.	Lillite, ap.,	.25	"	2.00
481.	Limbachite, r.,			
230.	Lime, r.,			
288.	Lime-malachite, r.,			
270.	Limestone, s.,	.05	"	.50
639.	Lime-wavellite, r.,			
260.	Limnite, r.,			
259.	Limonite,	.05	"	1.50
741.	Linarite,	.50	"	7.50
681.	Lindackerite,			
320.	Lindsayite, v.,			
79.	Linnæite,	.50	"	3.00
654.	Liroconite,	.50	"	3.50
644.	Liskeardite,	.25	"	1.50
460.	Lithia Mica, s.,	.05	"	4.00
N.	Lithidionite,	.75	"	2.00
544.	Lithiophilite,	.50	"	2.00
269.	Lithiophorite, r.,			
270.	Lithographic Stone,	.05	"	.25
492.	Lithomarge, v.,	.15	"	.75
109.	Livingstonite,	.50	"	2.50
237.	Lodestone, v.,	.10	"	2.00
338.	Loganite, r.,			
468A.	Loganite, v.,			
97.	Löllingite,	.15	"	.50
N.	Lorandite,	1.00	"	6.00
N.	Lossenite,			
325.	Lotalite, v.,			
435.	Louisite, r.,			
757.	Löweite,			
802.	Löwigite,			
313.	Loxoclase, v.,	.25	"	1.50
480.	Lucasite, r.,			
638.	Ludlamite,	.25	"	2.50
694.	Ludwigite,	.25	"	1.50
270.	Lumachelle, v.,	.25	"	2.00
682.	Lüneburgite,			
212.	Lussatite, r.,			
158.	Luzonite, r.,			
210.	Lydian Stone, s.v.,	.15	"	.50
458.	Lythrodes, r.,			
35.	Macfarlanite, r.,	$		$
N.	Mackintoshite,			
480.	Maconite, r.,			
270.	Madreporic Marble, v.,	.10	to	.50
271.	Magnesian Limestone, s.,	.05	"	.35
233.	Magnesian Menaccanite, v.,			
238.	Magnesioferrite,	.25	"	1.50
272.	Magnesite,	.05	"	1.00
237.	Magnetic Iron Ore, s.,	.05	"	6.00
20.	Magnetic Platinum, v.,			
74.	Magnetic Pyrites, s.,	.10	"	2.50
237.	Magnetite,	.05	"	6.00
N.	Magnetostibian,			
241.	Magnochromite, v.,			
810.	Magnolite, r.,			
288.	Malachite,	.10	"	4.00
325.	Malacolite, v.,	.10	"	.50
394.	Malacon, r.,	.05	"	.50
752.	Mallardite,			
762.	Mamanite, r.,			
549.	Manganapatjte, v.,			
262.	Manganbrucite, v.,			
325.	Manganhedenbergite, v.,			
258.	Manganite,	.25	"	2.50
237.	Manganmagnetite, v.,			
270.	Manganocalcite, v.,			
274.	Manganocalcite, v.,			
N.	Manganoferrite,			
462.	Manganophyllite, v.,	.25	"	2.00
226.	Manganosite,	.75	"	3.00
583.	Manganostibiite,			
330.	Manganpectolite, v.,	.25	"	3.50
270.	Marble, s.,	.05	"	.50
96.	Marcasite,	.10	"	2.50
335.	Marceline, r.,			
230.	Marcylite, r.,			
464.	Margarite,	.15	"	3.00
458.	Margarodite, v.,	.10	"	.75
389.	Marialite,			
N.	Mariposite,			
338.	Marmairolite, v.,			
58.	Marmatite, v.,	.25	"	.50
481.	Marmolite, v.,	.15	"	.75
N.	Marshite,			
620.	Martinite,			
166.	Martinsite, r.,			
232.	Martite, r.,	.10	"	1.50
714.	Mascagnite,	.50	"	2.00
319.	Maskelynite, r.,			
466.	Masonite, v.,	.10	"	.75
N.	Masrite,			
229.	Massicot,			
120.	Matildite,			
186.	Matlockite,	.50	"	10.00
376.	Matricite, r.,			
N.	Mauzeliite,			
651.	Mazapilite,	2.00	"	6.00
807.	Medjidite, r.,			

492.	Meerschaluminite, r.,	$		$
485.	Meerschaum, s.,	.10	to	1.25
386.	Meionite,	.25	"	2.00
230.	Melaconite, v.,	.25	"	1.50
544.	Melanchlor, r.,			
370.	Melanite, v.,	.25	"	2.50
348.	Melanocerite,			
479.	Melanolite, r.,			
211.	Melanophlogite, r.,	.15	"	3.00
506.	Melanosiderite, r.,			
N.	Melanostibian,			
421.	Melanotekite,	.50	"	2.00
193.	Melanothallite, r.,			
751.	Melanterite,	.15	"	2.00
391.	Melilite,	.25	"	3.00
500.	Melinite, ap.,			
352.	Meliphanite,	.25	"	2.50
824.	Mellite,	.50	"	2.50
77.	Melonite,			
509.	Melopsite, ap.,			
233.	Menaccanite, s.,	.05	"	.75
187.	Mendipite,	.50	"	2.00
766.	Mendozite,			
151	Meneghinite,	.35	"	5.00
526A.	Mengite, r.,			
212.	Menilite, v.,	.25	"	1.50
58.	Mercurial Blende, v.,			
16.	Mercury,	.25	"	2.00
462.	Meroxene, v.,	.05	"	3.00
272A.	Mesitite,	.50	"	2.00
456.	Mesole, v.,	.25	"	1.00
449.	Mesolin, r.,			
455.	Mesolite,	.25	"	2.50
453.	Mesotype, s.,	.10	"	3.00
593.	Messelite,			
619.	Metabrushite,			
471.	Metachlorite, r.,	.25	"	1.25
59.	Metacinnabarite,	.35	"	4.00
458.	Metasericite, v.,			
28.	Metastibnite, r.,			
797.	Metavoltine,			
481.	Metaxoite, r.,			
25.	Meteoric Iron, v.,	.25	"	8.00
25.	Meteoric Stones, v.,	1.00	"	5.00
270.	Mexican Onyx, v.,	.15	"	3.00
220.	Meymacite, r.,			
121.	Miargyrite,	1.50	"	3.00
232.	Micaceous Iron Ore, v.,	.10	"	.50
	Mica Group, 458–463.			
212.	Michaelite, v.,			
315.	Microcline,	.10	"	10.00
522.	Microlite,	.25	"	5.00
361.	Microsommite,	.75	"	2.00
H.	Middletonite,			
550.	Miesite, v.,			
320.	Mikrotin, r.,			
311.	Milarite,	.75	"	2.50
212.	Milk-opal, v.,	.10	"	1.00
210.	Milky Quartz, v.,	.05	"	.50
70.	Millerite,	.25	"	3.00
500.	Miloschite, ap.,			
551.	Mimetite,	.25	"	3.50
H.	Mineral Coal,	.05	"	.25
N.	Minervite,	$		$
244.	Minium,	.50	to	3.00
743.	Mirabilite,	.25	"	1.50
682.	Miriquidite, ap.,			
735.	Misenite,			
98.	Mispickel, s.,	.15	"	1.50
668.	Mixite,	.25	"	2.50
388.	Mizzonite,	.25	"	1.50
210.	Mocha-Stone, s. v.,	.10	"	2.00
34.	Molybdenite,	.15	"	20.00
219.	Molybdic Ocher, s.,	.25	"	1.25
219.	Molybdite,	.25	"	1.25
811.	Molybdomenite, r.,			
181.	Molysite,			
537.	Monazite,	.10	"	4.00
560.	Monetite,	.15	"	1.00
539.	Monimolite,			
325.	Monradite, r.,			
808.	Montanite,			
374.	Monticellite,	.15	"	3.50
496.	Montmorillonite,	.10	"	.50
430.	Monzonite, ap.,			
315.	Moonstone, v.,	.25	"	3.00
316.	Moonstone, v.,	.25	"	2.00
437.	Mordenite,			
750.	Morenosite,			
423.	Moresnetite, r.,	.50	"	2.00
N.	Morinite,			
516.	Mosandrite,	.25	"	2.00
210.	Moss-Agate, v.,	.10	"	2.00
277.	Mossottite, v.,	.25	"	2.00
567.	Mottramite, r.,			
338.	Mountain Cork, v.,	.10	"	1.00
338.	Mountain Leather, v.,	.10	"	1.00
338.	Mountain Wood, v.,	.25	"	.75
H.	Muckite,			
104.	Müllérine, r.,			
585.	Müllerite, r.,			
N.	Munkforssite,			
313.	Murchisonite, v.,			
409.	Muromontite, r.,			
N.	Mursinskite,			
458.	Muscovite,	.05	"	3.00
325.	Mussite, v.,	.10	"	.50
288.	Mysorin, r.,			
672.	Nadorite,	.25	"	3.00
509.	Næsumite, ap.,			
106.	Nagyagite,	.75	"	5.00
270.	Nail-head Spar, v.,	.25	"	1.50
269.	Namaqualite, ap.,			
165.	Nantokite,	.25	"	1.00
H.	Napalite,			
H.	Naphtha,			
H.	Naphthalene,			
H.	Native Humus Acid,			
453.	Natrolite,	.10	"	3.00
296.	Natron,	.25	"	1.50
346.	Natron-catapleiite, v.,			
545.	Natrophilite,			
560.	Natrophite, r.,			
48.	Naumannite,	.25	"	3.00
313.	Necronite, v.,			
453.	Needle Zeolite, s.,	.10	"	3.00

509. Nefedieffite, ap., . . $ $
H. Neft-gil, ...
262. Nemalite, v., . . .
376. Neochrysolite, r., . . .75 to 5.00
430. Neociano, ap., . . . 1.00 " 3.00
509. Neolite, ap., ...
509. Neotocite, ...
149. Nepaulite, r., . . .
357. Nephelite, ...10 " 3.00
338. Nephrite, v., ...15 " .75
N. Neptunite, ...
295. Nesquehonite, ...50 " 2.00
H. Neudorfite, ...
497. Neurolite, r., . . .
22. Nevyanskite, v., . .
621. Newberyite, ...25 " 1.00
N. Newboldite, ...
494. Newtonite, ...
N. Niccochromite, . .
98. Niccoliferous Arsenopyrite, v., ...
25. Niccoliferous Iron (Awaruite), v., .
74. Niccoliferous Pyrite, s., ...10 " 2.50
71. Niccolite, ...25 " 3.00
N. Nickel, ...
602. Nickel Bloom, s., . .25 " 2.50
90. Nickel Glance, s., . .50 " 3.50
237. Nickel Oxide, r., . .
N. Nickel-skutterudite,
509. Nigrescite, ap., . .
250. Nigrine, v., ...10 " 1.50
684. Niter, ...
687. Nitrobarite, ...
685. Nitrocalcite, ...
690. Nitroglauberite, . .
686. Nitromagnesite, . .
711. Nivenite, v., . . .
195. Nocerite, ...25 " 1.50
529. Nohlite, r., ...
H. Non-caking Coal, . .05 " .25
505. Nontronite, v., . .
338. Noralite, v., ...
691. Nordenskiöldine, . .
338, Nordenskiöldite, v.,
428. Nordmarkite, v., . .
N. Northupite, ...25 " 3.00
364. Nosean, s., ...50 " 1.50
364. Noselite, ...50 " 1.50
483A. Noumeite, s., ...10 " .75
550. Nussierite, v., . . .
387. Nuttalite, v., ...15 " 1.00

500. Ochran, ap,, ...
674. Ochrolite, ...
252. Octahedrite, ...25 " 5.00
458. Oellacherite, v., . .
394. Oerstedite, r., . . .
N. Offrétite, ...15 " 1.50
433. Okenite, ...25 " 1.25
316. Olafite, v., ...50 " 1.50
64. Oldhamite, ...
317. Oligoclase, ...10 " 3.00
273. Oligonite, v., ...
561. Olivenite, ... $.25 to $5.00
376. Olivine, v., ...05 " .50
325. Omphacite, v., ...15 " 1.00
458. Oncophyllite, v., . .
458. Oncosine, v., . . .
210. Onegite, s. v., ...50 " 3.00
61. Onofrite, ...
811. Onofrite, r., ...
387. Ontariolite, v., . . .
210. Onyx, v., ...15 " 2.50
270. Onyx, Mexican, v., .15 " 3.00
270. Oölite, v. (v. 210), . .05 " .75
458. Oosite, r., ...
212. Opal, ...10 " 6.00
212. Opal-agate, v., ...15 " 2.50
212. Opalized Wood, v., . .15 " 12.00
395. Orangite, v., ...25 " 5.00
500. Oravitzite, ap., . .
37. Orileyite, r., ...
619. Ornithite, v., . . .
27. Orpiment, ...15 " 2.00
409. Orthite, s., ...10 " 1.00
313. Orthoclase, ...05 " 3.50
438. Oryzite, r., ...
64. Osbornite, r., . . .
330. Osmelite, v., ...
22. Osmiridium, s., . . .20 " 2.00
549. Osteolite, v., ...
467. Ottrelite, ...25 " 1.50
370. Ouvarovite, s. v., . . .50 " 2.00
823. Oxalate of Sodium and Ammonium, r.,
585. Oxammite, r., . . .
822. Oxammite, ...
435. Oxhaverite, v., . .
456. Ozarkite, v., ...10 " 1.00
H. Ozocerite, ...10 " .75

205. Pachnolite, ...25 " 1.25
97. Pacite, r., ...
480. Painterite, r., . . .
335. Paisbergite, v., ...15 " 5.00
N. Palagonite, ...
338. Paligorskite, r., . .
230. Palladinite, r., . . .
23. Palladium, ... 1.00 " 3.00
13. Palladium Gold, v.,
704. Pandermite, r., . . .15 " .75
787. Paposite, r., ...
233. Paracolumbite, v., . .05 " .35
313. Paradoxite, v., . . .
H. Paraffin, ...
459. Paragonite, ...
389. Paralogite, r., . . .
794. Paraluminite, . . .
N. Paramelaconite, . .
271A. Parankerite, s., . .
N. Parathorite, ...
338. Pargasite, v., ...05 " 5.00
284. Parisite, ... 1.50 " 5.00
N. Paroligoclase, . . .
458. Parophite, r., . . .
372. Partschinite, . . .
222. Partzite, r., ...15 " 1.00
387. Passauite, v., . . .

		$	$
211.	Passyite, r.,		
789.	Pastreite, r.,		
819.	Pateraite, r.,		
479.	Pattersonite, r.,		
H.	Peacock Coal, v.,	.05 to	.25
N.	Pearceite,		
212.	Pearl Sinter, v.,		
271.	Pearl Spar, v.,	.10 "	2.50
324.	Peckhamite, r.,		
330.	Pectolite,	.15 "	3.50
641.	Peganite,		
269.	Pelagite, ap.,		
N.	Pelagosite,		
509.	Pelhamine, ap.,		
480.	Pelhamite, v.,		
270.	Pencatite, r.,		
N.	Penfieldite,		
468A.	Penninite,	.25 "	1.50
65.	Pentlandite,		
509.	Penwithite, r.,		
192.	Percylite,		
225.	Periclase,	.25 "	3.00
316.	Pericline, v.,	.25 "	2.00
376.	Peridot, s.,	.05 "	.50
316.	Peristerite, v.,	.25 "	1.50
518.	Perovskite,	.50 "	4.00
509.	Persbergite, ap.,	.50 "	1.50
313.	Perthite, r.,	.15 "	2.00
310.	Petalite,	.15 "	2.50
212.	Petrified Wood, v.,		
210.	(Opalized and Jasperized),	.10 "	12.00
H.	Petrolene,		
H.	Petroleum,	.05 "	.25
796.	Pettkoite, r.,		
44.	Petzite,	.50 "	3.00
338.	Phaactinite, r.,		
447.	Phacolite, v.,	.25 "	6.00
617.	Pharmacolite,	.50 "	2.50
646.	Pharmacosiderite,	.50 "	2.00
324.	Phästine, r.,		
382.	Phenacite,	.10 "	3.50
480.	Philadelphite, r.,		
776.	Phillipite, r.,		
441.	Phillipsite,	.25 "	4.00
462A.	Phlogopite,	.05 "	.75
726.	Phœnicochroite,		
491.	Pholidolite,		
286.	Phosgenite,	.25 "	7.50
585.	Phosphammite, r.,		
549.	Phosphatic Nodules, r.,	.05 "	.25
549.	Phosphorite, v.,	.05 "	.25
609.	Phosphosiderite,		
664.	Phosphuranylite,		
335.	Photicite, r.,	.15 "	1.00
467.	Phyllite, v.,	.10 "	.50
H.	Phylloretin,		
397.	Physalite, v.,		
H.	Phytocollite,		
H.	Piauzite,		
648.	Picite, r.,		
768.	Pickeringite,	.10 "	1.00
234.	Picotite, v.,		
768.	Picroallumogene, r.,	.25 "	2.50
407.	Picroepidote, r.,		
509.	Picrofluite, ap.,		
481.	Picrolite, v.,	.10 to	.75
760.	Picromerite,		
595.	Picropharmacolite,		
325.	Picrophyll, r.,		
509.	Picrosmine, ap.,		
456.	Picrothomsonite, r.,		
337.	Piddingtonite, r.,		
408.	Piedmontite,	.25 "	2.00
824.	Pigotite, r.,		
509.	Pihlite, ap.,		
504.	Pilarite, v.,		
509.	Pilinite, ap.,		
509.	Pilolite, ap.,		
483A.	Pimelite, r.,		
695.	Pinakiolite,	.25 "	3.00
505.	Pinguite, v.,		
458.	Pinitoid, r.,	.15 "	.50
705.	Pinnoite,		
N.	Pirssonite,	.75 "	4.00
753.	Pisanite,	.25 "	1.50
270.	Pisolite, v.,	.25 "	2.00
794.	Pissophanite, r.,		
272A.	Pistomesite, v.,	.50 "	2.00
711.	Pitchblende, s.,	.25 "	4.00
325.	Pitkärantite, r.,		
H.	Pittasphalt,		
678.	Pitticite,		
801.	Plagiocitrite, r.,		
122.	Plagionite,	.50 "	3.00
108.	Plakodin, ap.,		
611.	Planerite, r.,		
210.	Plasma, v.,	.15 "	.75
20.	Platinum,	.50 "	5.00
251.	Plattnerite,	.50 "	5.00
120.	Plenargyrite, r.,		
234.	Pleonaste, s. v.,	.10 "	1.00
552.	Pleonectite, r.,	.75 "	3.00
582.	Pleurasite, r.,		
500.	Plinthite, ap.,		
435.	Plombierite, r.,		
2.	Plumbago, s.,	.10 "	1.50
498.	Plumballophane, r.,		
229.	Plumbic Ocher, s.,		
270.	Plumbocalcite, v.,	.50 "	4.00
241.	Plumboferrite, r.,		
658.	Plumbogummite,		
108.	Plumbomanganite, ap.,		
108.	Plumbostannite, ap.,		
458.	Plumose Mica, s. v.,	.10 "	1.25
249.	Polianite,	.25 "	1.00
322.	Pollucite,	.50 "	3.00
370.	Polyadelphite, v.,	.25 "	1.25
458.	Polyargite, r.,		
157.	Polyargyrite,		
557.	Polyarsenite, v.,	.75 "	3.00
156.	Polybasite,	.50 "	8.00
535.	Polycrase,	.50 "	2.00
75.	Polydymite,	1.50 "	3.00
762.	Polyhalite,	.15 "	.75
509.	Polyhydrite, ap.,		
N.	Polylite,		
461.	Polylithionite, v.,		

533. Polymignite, ... $ .75 to $3.50
550. Polysphœrite, v., . .
149. Polytelite, r., . . .
481. Porcellophite, v., . .15 " .50
13. Porpezite, v., . . .
500. Portite, ap., ...
H. Posepnyte, ...
764. Potash Alum, s., . .15 " .75
458. Potash Mica, s., . . .05 " 3.00
484. Potstone, v., ...05 " .35
816. Powellite, ...
210. Prase, v., ...15 " .50
479. Prasilite, r., ...
212. Precious Opal, v., . .25 " 6.00
270. Predazzite, r., ...25 " 1.00
411. Prehnite, ...15 " 2.50
411. Prehnitoid, r., . . .
388. Prehnitoid, v., . . .
58. Přibramite, v., . . .
704. Priceite, r., ...15 " .75
429. Prismatine, r., . . .
469. Prochlorite, ...05 " 1.00
185. Proidonite, r., . . .
204. Prosopite, ...
325. Protheite, v., . . .
461. Protolithionite, r., .
505. Protonontronite, r.,
480. Protovermiculite, r., .10 " .75
145. Proustite, ...50 " 5.00
549. Pseudoapatite, v., .
538. Pseudoberzeliite, r., .75 " 3.00
462. Pseudobiotite, r., . .
246. Pseudobrookite, . . .75 " 1.50
180. Pseudocotunnite, r.,
570. Pseudomalachite, . .25 " 2.50
437. Pseudonatrolite, . .
195. Pseudonocerina, r., .
468A. Pseudophite, v., . .
389. Pseudo-Scapolite, r.,
344. Pseudosmaragd, r., .
543. Pseudotriplite, r., . 1.00 " 3.00
269. Psilomelane, ...05 " 1.50
567. Psittacinite, ... 1.00 " 3.00
342. Pterolite, r., ...
462B. Pterolite, r., ...
436. Ptilolite, ...25 " 2.50
542. Pucherite, ...75 " 5.00
270. Pudding-stone, v., (Also v. of 210), . .10 " 1.25
78. Purple Copper Ore, s., ...15 " 2.00
397. Pycnite, v., ...25 " 2.50
458. Pycnophyllite, v., .
509. Pyknotrop, ap., . .
325. Pyrallolite, r., . . .
484. Pyrallolite, v., . . .
144. Pyrargyrite, ...50 " 7.00
85. Pyrite, ...10 " 3.50
98. Pyrites, Arsenical, s., .15 " 1.50
96. " Cockscomb, s., .10 " 1.50
83. " Copper, s., . .10 " 3.00
85. " Iron, s., . . .10 " 3.50
74. " Magnetic, s., .10 " 2.50
96. " Radiated, v., .10 " 1.50
84. " Tin, s., ...15 " 2.50

267. Pyroaurite, ... $ .50 to $1.50
520. Pyrochlore, ...25 " 2.50
263. Pyrochroite, ...50 " 1.50
509. Pyroïdesine, ap., . .
254. Pyrolusite, ...05 " 2.50
510. Pyromelane, r., . .
550. Pyromorphite, ...15 " 5.00
370. Pyrope, v., ...10 " 2.00
N. Pyrophanite, . . .
586. Pyrophosphorite, r.,
497. Pyrophyllite, ...10 " .75
H. Pyropissite, ...15 " .75
H. Pyroretinite, ...
409. Pyrorthite, v., . . .
480. Pyrosclerite, r., . .
385. Pyrosmalite, ...35 " 7.50
146. Pyrostilpnite, . . . 1.50 " 3.50
325. Pyroxene, ...05 " 7.50
522. Pyrrhite, r., ...
74. Pyrrhotite, ...10 " 2.50

210. Quartz, ...05 " 5.00
773. Quenstedtite, . . .
804. Quetenite, ...
16. Quicksilver, s., . . .25 " 2.00
509. Quincite, ap., . . .
N. Quirogite, ...

269. Rabdionite, ap., . .
461. Rabenglimmer, v., . .25 " 2.00
96. Radiated Pyrites, v., .50 " 1.50
210. " Quartz, v., .25 " .75
453. Radiolite, v., . . .
789. Raimondite, ...
208. Ralstonite, ...50 " 5.00
100. Rammelsbergite, . . .50 " 2.00
430. Ramosite, ap., . . .
212. Randannite, v., . .
309. Randite, r., ...25 " 1.25
457. Ranite, v., ...
N. Ransatite, ...
338. Raphilite, v., . . .
232. Raphisiderite, r., .
462. Rastolyte, r., . . .
N. Rathite, ...
496. Razoumovskyn, r., . .25 " 1.00
26. Realgar, ...25 " 3.50
492. Rectorite, r., ...25 " 1.00
594. Reddingite, ...
785. Redingtonite, r., . .
232. Red Iron Ore, s., . .05 " 4.00
232. " Ocher, v., . . .05 " .35
585. Redondite, r., . . .
212. Red-opal, v., ...10 " .75
54. Redruthite, s., . . .15 " 6.00
483A. Refdanskite, r., . .
H. Refikite, ...
162. Regnolite, r., . . .
270. Reichite, v., ...
819. Reinite, ...
304. Remingtonite, ...50 " 5.00
484. Rensselaerite, v., . .05 " .35
N. Resanite, ...
212. Resin-opal, v., ...10 " 1.00
509. Restormelite, ap., .

481.	Retinalite, v.,	$		$	
H.	Retinellite,				
H.	Retinite,	.10	to	1.00	
H.	Reussinite,				
113.	Rezbanyite,				
25.	Rhabdite,r.,				
605.	Rhabdophanite,	.10	"	1.00	
667.	Rhagite,				
500.	Rhodalite, ap.,				
N.	Rhodarsenian,				
13.	Rhodite, v.,				
699.	Rhodizite,				
468A.	Rhodochrome, v.,	.25	"	2.00	
274.	Rhodochrosite,	.15	"	5.00	
335.	Rhodonite,	.10	"	10.00	
N.	Rhodophosphite,				
210.	Riband Jasper, v.,	.25	"	1.00	
653.	Richellite, r.,	.50	"	1.50	
155.	Richmondite, r.,				
264.	" r.,				
338.	Richterite, v.,	.25	"	2.50	
340.	Riebeckite,				
517.	Rinkite,				
149.	Rionite, v.,				
468.	Ripidolite, s.,	.10	"	3.50	
388.	Riponite, v.,				
147.	Rittingerite,	3.00	"	5.00	
222.	Rivotite, r.,				
H.	Rochlederite,				
210.	Rock Crystal,v.,	.05	"	5.00	
746.	Rock-gypsum, v.,	.05	"	.25	
270.	Rock-meal, v.,	.10	"	.50	
270.	Rock-milk, s.v.,	.05	"	.35	
166.	Rock Salt, s.,	.10	"	1.50	
N.	Roeblingite,				
379A.	Roepperite,	.50	"	2.50	
535.	Rogersite, ap.,	.25	"	1.50	
671.	Romeite,				
778.	Römerite,	.25	"	2.00	
463.	Roscoelite,	.50	"	7.50	
480.	Roseite, r.,	.15	"	1.50	
590.	Roselite,	.75	"	4.00	
331.	Rosenbuschite,	.25	"	2.00	
210.	Rose Quartz, v.,	.10	"	2.00	
458.	Rosite, r.,				
622.	Rösslerite, r.,				
344.	Rosterite, r.,				
H.	Rosthornite,				
370.	Rothoffite, v.,	.50	"	1.00	
483.	Röttisite, r.,	.10	"	.75	
N.	Roumanite,				
N.	Rowlandite,				
462.	Rubellan, r.,	.50	"	2.50	
426.	Rubellite, v.,	.05	"	4.00	
509.	Rubislite, ap.,				
783.	Rubrite, r.,				
231.	Ruby, v.,	.25	"	4.00	
234.	" Balas, s. v.,	.25	"	3.00	
58.	" Blende, v.,	.15	"	3.00	
224.	" Copper, s.,	.10	"	7.50	
145.	" Silver, s. 144, 145,	.50	"	5.00	
234.	" Spinel, v.,	.25	"	3.00	
58.	" Zinc, s,	.15	"	3.00	
270.	Ruin Marble, v.,	.50	"	3.00	
H.	Rumänite,	$		$	
479.	Rumpfite,				
523.	Rutherfordite, r.,				
250.	Rutilated Quartz, v.,	.25	to	9.00	
250.	Rutile,	.10	"	9.00	
99.	Safflorite,	.25	"	2.50	
168.	Sal-Ammoniac,	.25	"	2.50	
325.	Salite, v.,	.15	"	1.00	
466.	Salmite, v.,				
166.	Salt, s.,	.10	"	1.50	
684.	Saltpeter, s.,				
N.	Salvadorite,				
529.	Samarskite,	.25	"	2.50	
498.	Samoite, r.,				
149.	Sandbergerite, v.,				
210.	Sandstone, v.,	.05	"	.25	
210.	" Flexible, v.,	.15	"	1.50	
N.	Sanguinite,				
313.	Sanidine, v.,	.25	"	1.00	
488.	Saponite,	.10	"	.50	
231.	Sapphire, v.,	.25	"	3.00	
210.	Sapphire-Quartz, v.,	.25	"	1.00	
430.	Sapphirine,	.50	"	3.00	
N.	Sarawakite,				
390.	Sarcolite,	.25	"	2.00	
555.	Sarcopside, r.,				
210.	Sard, v.,	.10	"	.50	
210.	Sardonyx, v.,	.15	"	1.00	
557.	Sarkinite,	.50	"	2.50	
115.	Sartorite,				
457.	Sasbachite, ap.,				
265.	Sassolite,	.35	"	1.50	
270.	Satin Spar, v.,	.15	"	.75	
746.	Satin Spar, v.,	.10	"	1.25	
406.	Saussurite, r.,	.15	"	1.00	
179.	Scacchite,				
387.	Scapolite, s.,	.10	"	4.00	
500.	Scarbroite, r.,				
129.	Schapbachite,				
814.	Scheelite,	.25	"	3.00	
H.	Scheererite,				
325.	Schefferite, v.,	.25	"	2.00	
324.	Schiller Spar, r.,				
125.	Schirmerite,				
669.	Schneebergite, r.,				
445.	Schneiderite, v.,				
719.	Schoarite, v.,				
426.	Schorl, s.,	.05	"	10.00	
371.	Schorlomite,	.15	"	1.50	
H.	Schraufite,	.25	"	1.25	
25.	Schreibersite, r.,				
309.	Schröckinergite, r.,				
500.	Schrötterite,	.50	"	1.50	
2.	Schungite, r.,				
188.	Schwartzembergite,	.50	"	2.50	
148.	Schwatzite, v.,				
H.	Scleretinite,				
454.	Scolecite,	.25	"	5.00	
607.	Scorodite,	.25	"	2.50	
407.	Scorza, v.,				
506.	Scotiolite, v.,				
456.	Scoulerite, v.,				
605.	Scovillite, v.,	.10	"	1.00	
447.	Seebachite, v.,	.25	"	4.00	

309.	Selbite, r., ...	$	$
118.	Seleniferous Galeno-bismutite, v., . . .		
746.	Selenite, v., ...	.05 to	4.00
5.	Selenium, ...		
218.	Selenolite, r., . . .		
4.	Selensulphur, . . .	.25 "	4.00
6.	Selen-Tellurium, . .		
177.	Sellaite, ...	4.00 "	10.00
500.	Selwynite, ap., . . .		
212.	Semi-Opal, v., . . .	.10 "	3.00
133.	Semseyite, ...		
214.	Senarmontite, . . .	.25 "	5.00
485.	Sepiolite, ...	.10 "	1.25
458.	Sericite, v., ...	.10 "	.75
481.	Serpentine, ...	.05 "	2.00
481.	" Marble, v.,	.15 "	2.00
782.	Serpierite, ...	.50 "	5.00
H.	Settling Stones Resin, ...		
465.	Seybertite, ...	.15 "	2.00
270.	Shell-Marble, v., . .	.25 "	1.00
273.	Siderite, ...	.05 "	3.00
25.	Siderites (Meteoric), v., ...	.25 "	8.00
273.	Siderodot, v., . . .		
25.	Siderolites, v., . . .	1.50 "	10.00
799.	Sideronatrite, . . .	.50 "	3.00
462.	Siderophyllite, v., .	.25 "	2.00
273.	Sideroplesite, v., . .		
H.	Siegburgite, ...	.25 "	1.50
79.	Siegenite, v., ...	.50 "	3.00
270.	Siena Marble, v., . .	.10 "	.50
320.	Sigterite, r., ...		
30.	Silaonite, r., ...		
338.	Silfbergite, v., . . .		
210.	Siliceous Sinter, v.,		
210.	Silicified Wood, v., (also v., 212), . .	.10 "	12.00
399.	Sillimanite, ...	.10 "	.75
14.	Silver, ...	.25 "	7.50
153.	" Brittle, s., . .	.25 "	6.00
144.	" Dark Ruby, s.,	.50 "	7.00
42.	" Glance, s., . .	.25 "	8.00
169.	" Horn, s., . .	.25 "	4.00
145.	" Light Ruby, s.,	.50 "	5.00
H.	Simetite, ...	.50 "	2.00
500.	Sinopite, ap., . . .		
524.	Sipylite, ...	1.00 "	5.00
22.	Siserskite, v., . . .		
466.	Sismondine, v., . .		
N.	Sjogruvfite, ...		
526A.	Skogbölite, ...	.50 "	2.00
95.	Skutterudite, . . .	.75 "	2.00
457.	Sloanite, ap., . . .		
87.	Smaltite, ...	.25 "	3.00
338.	Smaragdite, v., . . .	.25 "	1.50
500.	Smectite, ap., . . .		
493.	Smectite, v., ...		
275.	Smithsonite, ...	.10 "	5.00
210.	Smoky Quartz, v., .	.05 "	3.00
N.	Snarumite, ...		
484.	Soapstone, s., . . .	.05 "	.35
316.	Soda Feldspar, s., .	.05 "	3.00
362.	Sodalite, ...	.25 "	3.00
683.	Soda Niter, . .	$ .10 to	$.75
459.	Sodium Mica, s., . .		
90.	Sommarugaite, r., .		
768.	Sonomaite, r., . . .		
487.	Spadaite, ...		
441.	Spangite, r., ...		
732.	Spangolite, ...		
273.	Spathic Iron, s., . .	.05 "	3.00
96.	Spear Pyrites, v., . .	.50 "	2.50
232.	Specular Iron, s., .	.05 "	4.00
93.	Sperrylite, ...	.50 "	2.00
370.	Spessartite, v., . . .	.10 "	2.00
643.	Sphærite, ...		
276.	Sphærocobaltite, . .	.50 "	7.50
273.	Sphærosiderite, v., .		
443.	Sphærostilbite, v., .	.25 "	3.00
58.	Sphalerite, ...	.10 "	3.00
510.	Sphene, s., ...	.10 "	7.50
430.	Sphenoclase, ap., .		
500.	Sphragidite, ap., . .		
234.	Spinel, ...	.10 "	5.00
510.	Spinthere, v., . . .		
554.	Spodiosite, ...		
327.	Spodumene, ...	.10 "	3.50
549.	Staffelite, v., . . .	.25 "	2.00
270.	Stalactite, v., . . .	.15 "	3.00
270.	Stalagmite, v., . . .	.10 "	3.00
H.	Stanekite, . . .		
58.	Stanniferous Blende, v., ...		
84.	Stannite, ...	.15 "	2.50
462A.	Star Mica, s., ...	.05 "	.75
210.	Star Quartz (Asterated), v., ...		
231.	Star Sapphire, v., .	.50 "	3.00
698.	Stassfurtite, s., . .	.25 "	2.00
428.	Staurolite, ...	.10 "	1.50
479.	Steatargillite, r., . .		
484.	Steatite, s., ...	.05 "	.35
437.	Steeleite, r., ...		
349.	Steenstrupine, r., . .		
45.	Steinmannite, v., .		
N.	Stellarite, ...		
153.	Stephanite, ...	.25 "	6.00
615.	Stercorite, ...		
458.	Sterlingite, v., . . .		
56.	Sternbergite, . . .	1.00 "	2.50
222.	Stetefeldtite, r., . .		
222.	Stibianite, r., . . .		
583.	Stibiatil, r., ...		
222.	Stibiconite, ...	.15 "	1.00
222.	Stibioferrite, r., . .		
N.	Stibiotantalite, . . .		
28.	Stibnite, ...	.15 "	10.00
210.	Stibnite in Quartz, v., ...		
443.	Stilbite, ...	.10 "	3.00
474.	Stilpnomelane, . . .	.15 "	1.25
719.	Stinkstone, v., . . .	.10 "	.50
270.	Stinkstone, v., . . .		
496.	Stolpenite, v., . . .		
817.	Stolzite, ...	.75 "	3.00
325.	Strakonitzite, r., . .		
335.	Stratopeite, r., . . .		
248.	Stream Tin, v., . . .	.10 "	.50

608.	Strengite,	$ .25	to	$1.50
475.	Strigovite, ,			
389.	Stroganovite, r.,			
55.	Stromeyerite,	1.00	"	3.00
280.	Strontianite,	.10	"	3.00
270.	Strontianocalcite, v.,			
585.	Struvite,			
509.	Stübelite, ap.,			
41.	Stützite,			
768.	Stüvenite, r.,			
141.	Stylotypite,			
478.	Subdelessite, r.,			
H.	Succinellite,			
H	Succinite,	.25	"	3.00
498.	Sulfatallophan, r.,			
N.	Sulfoborite,	.75	"	3.00
211.	Sulfuricin, r.,			
728.	Sulphohalite,	5.00	"	7.50
3.	Sulphur,	.15	"	20.00
31.	Sulphurous Tetradymite, v.,	.25	"	3.00
N.	Sundtite,			
317.	Sunstone, s., v.,	.25	"	3.00
734.	Susannite, r.,			
693.	Sussexite,	.25	"	2.00
N.	Svabite,	.25	"	3.00
679.	Svanbergite,	.50	"	5.00
N.	Sychnodymite,			
104.	Sylvanite,	.75	"	7.50
167.	Sylvite,	.10	"	1.25
598.	Symplesite,	.50	"	2.00
579.	Synadelphite,	.75	"	3.00
756.	Syngenite,	.25	"	3.00
338.	Syntagmatite, v.,			
324.	Szaboite, v.,			
697.	Szaibelyite,	.50	"	2.50
745.	Szmikite,			
212.	Tabasheer, r.,			
468A.	Tabergite, r.,			
210.	Tabular Quartz, v.,	.25	"	1.00
329.	" Spar, s.,	.10	"	4.00
202.	Tachhydrite,	.15	"	.50
394.	Tachyaphaltite, r.,			
630.	Tagilite,			
484.	Talc,	.05	"	.35
549.	Talc-apatite, r.,			
479.	Talc-chlorite, r.,			
458.	Talcite, v.,			
484.	Talcoid, r.,			
509.	Talcosite, ap.,			
555.	Talktriplite, v.,			
193.	Tallingite, r.,	1.00	"	2.50
767.	Tamarugite,			
N.	Tammite,			
320.	Tankite, v.,			
217.	Tantalic Ocher, r.,			
526.	Tantalite,	.15	"	3.00
143.	Tapalpite,			
527.	Tapiolite,			
645.	Taranakite, r.,			
727.	Tarapacaite, r.,			
45.	Targionite, v.,			
277.	Tarnowitzite, v.,	.50	"	1.50
H.	Tasmanite,	.15	"	.75
748.	Tauriscite, r.,	$		$
575.	Tavistockite,			
715.	Taylorite,			
675.	Taznite, r.,			
750.	Tecticite, r.,			
N.	Telaspyrine,			
31.	Telluric Bismuth, s.,	.25	to	3.00
218.	Tellurite,	.75	"	2.00
7.	Tellurium,	.25	"	3.00
305.	Tengerite,	.50	"	2.50
149.	Tennantite,	.35	"	5.00
230.	Tenorite,	.25	"	3.50
379.	Tephroite,	.15	"	5.00
381.	Tephrowillemite, v.,			
N.	Tequezquite,			
500.	Teratolite, ap.,			
389.	Terenite, r.,			
25.	Terrestrial Iron,	.25	"	8.00
287.	Teschemacherite,			
435.	Tesselite, v.,			
31.	Tetradymite,	.25	"	3.00
N.	Tetragophosphite,			
148.	Tetrahedrite,	.15	"	5.00
337.	Thalackerite, v.,			
502.	Thaumasite,	.15	"	2.50
716.	Thenardite,	.10	"	4.00
294.	Thermonatrite,			
481.	Thermophyllite, v.,			
821.	Thierschite, r.,			
270.	Thinolite, r.,	.10	"	.75
273.	Thomäite, r.,			
206.	Thomsenolite,	.25	"	4.00
456.	Thomsonite,	.10	"	2.00
395.	Thorite,	.25	"	10.00
712.	Thorogummite, r.,	.50	"	2.50
N.	Thrombolite,			
406.	Thulite, v.,	.15	"	1.50
473.	Thuringite,	.10	"	.75
60.	Tiemannite,	.25	"	3.00
210.	Tiger-eye, v.,	.10	"	3.00
N.	Tilasite,			
224.	Tile Ore, v.,			
47.	Tilkerodite, r.,			
19.	Tin,			
707.	Tincalconite, r.,			
84.	Tin Pyrites, s.,	.15	"	2.50
248.	Tin Stone, s.,	.10	"	2.50
233.	Titanic Iron, s.,	.05	"	.75
510.	Titanite,	.10	"	7.50
376.	Titan-olivine, r.,			
510.	Titanomorphite, v.,			
248.	Toad's-Eye Tin, v.,	.10	"	2.50
435.	Tobermorite, r.,			
173.	Tocornalite, r.,			
90.	Tombazite, r.,			
397.	Topaz,	.05	"	15.00
370.	Topazolite, v.,	.50	"	2.00
H.	Torbanite,	.25	"	1.00
659.	Torbernite,	.25	"	3.50
481.	Totaigite, r.,			
210.	Touchstone, v.,	.15	"	.50
426.	Tourmaline,	.05	"	10.00
269.	Transvaalite, ap.,			
370.	Trautwinite, r.,			
325.	Traversellite, v.,	.10	"	.75

270.	Travertine, v.,	$ .10 to	$ .75
2.	Tremenheerite, r.,		
338.	Tremolite, v.,	.10 "	2.00
596.	Trichalcite,		
211.	Tridymite,	.25 "	2.00
380.	Trimerite,		
H.	Trinkerite,		
543.	Triphylite,	.15 "	2.00
555.	Triplite,	.25 "	1.50
556.	Triploidite,	.25 "	1.50
212.	Tripoli Slate, v.,		
212.	Tripolite, v.,	.05 "	.35
675.	Trippkeite,		
350.	Tritomite,	.50 "	2.00
665.	Trögerite,	.50 "	2.50
73.	Troilite,	1.00 "	3.00
645.	Trolleite, r.,		
299.	Trona,	.25 "	1.50
381.	Troostite, v.,	.10 "	7.50
513.	Tscheffkinite,	.25 "	2.50
316.	Tschermakite, v.,		
765.	Tschermigite,	.15 "	.75
492.	Tuesite, v.,		
270.	Tufa, Calc v.,	.05 "	.50
220.	Tungstite,		
255.	Turgite,	.10 "	.50
642.	Turquois,	.15 "	3.00
635.	Tyrolite,	.25 "	1.50
182.	Tysonite,	.50 "	4.00
233.	Uddevallite, v.,		
411.	Uigite, r.,		
H.	Uintahite,	.15 "	.75
708.	Ulexite,	.15 "	1.50
92.	Ullmannite,	.35 "	5.00
N.	Umangite,		
807.	Uraconite, r.,	.25 "	3.00
325.	Uralite, r.,		
338.	Uralite, v.,		
409.	Uralorthite, v.,		
711.	Uraninite,	.25 "	4.00
711.	Uranniobite, v.,		
807.	Uranochalcite, r.,		
663.	Uranocircite,	.50 "	2.50
503.	Uranophane,	.50 "	2.00
807.	Uranopilite,		
713.	Uranosphærite,		
662.	Uranospinite,		
307.	Uranothallite,	.50 "	2.00
395.	Uranothorite, v.,		
503.	Uranotil, s.,	.50 "	2.00
H.	Urpethite,		
786.	Utahite,	.25 "	.75
370.	Uvarovite, v.,	.50 "	2.00
480.	Vaalite, r.,	.25 "	1.00
N.	Valaite,		
216.	Valentinite,	.25 "	2.00
N.	Valleite,	.50 "	2.50
108.	Valleriite, ap.,	.50 "	1.00
217.	Vanadic Ocher, r.,		
552.	Vanadinite,	.25 "	9.00
567.	Vanadiolite, r.,		
463.	Vanadium Mica, s.,	.50 "	7.50
423.	Vanuxemite, r.,	.25 "	1.50
78.	Variegated Copper Ore, s.,	$ .15 to	$ 2.00
611.	Variscite,	.15 "	4.00
269.	Varvicite, r.,		
727.	Vauquelinite,	1.00 "	3.50
467.	Venasquite, v.,		
509.	Venerite, ap.,		
481.	Verd-Antique, v,	.15 "	2.00
270.	Verd-Antique Marble, v.,		
480.	Vermiculite, r.,	.10 "	.75
	Vermiculites, following 480.		
N.	Vesbine,	.25 "	1.50
211.	Vestan, r.,		
393.	Vesuvianite,	.10 "	3.00
637.	Veszelyite,		
323.	Victorite, v.,		
529.	Vietinghofite, r.,		
376.	Villarsite, r.,		
325.	Violan, v.,	.25 "	1.00
479.	Viridite, r.,		
755.	Vitriol, Blue, s.,	.10 "	1.50
597.	Vivianite,	.15 "	4.00
807.	Voglianite, r.,		
309.	Voglite,	1.50 "	3.50
462.	Voigtite, r.,		
633.	Volborthite,		
222.	Volgerite, r.,		
796.	Voltaite,		
108.	Voltzite,		
722.	Vulpinite, v.,		
269.	Wad, r.,	.10 "	1.50
423.	Wagite, v.,		
553.	Wagnerite,	.15 "	2.50
H.	Walchowite,		
338.	Waldheimite, r.,		
330.	Walkerite, v.,		
666.	Walpurgite,	.35 "	1.50
306.	Walthérite, r.,		
465A.	Waluewite, v.,		
622.	Wapplerite,	.25 "	1.50
N.	Wardite,	.75 "	3.00
740.	Waringtonite, v.,		
126.	Warrenite,		
700.	Warwickite,	.15 "	1.00
233.	Washingtonite, v.,	.15 "	.75
409.	Wasite, r.,		
223.	Water,		
763.	Wattevillite,		
639.	Wavellite,	.10 "	2.00
N.	Webnerite,		
33.	Wehrlite,		
285.	Weibyeïte, r.,		
313.	Weissigite, v.,		
N.	Wellsite,		
387.	Wernerite,	.10 "	4.00
791.	Werthemanite, r.,		
399.	Westanite, r.,		
N.	Whartonite,		
H.	Wheelerite,		
136.	Wheel Ore, s.,	.35 "	3.50
821.	Whewellite,	2.00 "	6.00
216.	White Antimony, s.,	.25 "	2.00

		$		$
213.	White Arsenic, s., .			
281.	White Lead Ore, s.,	.10	to	6.00
458.	White Mica, s., . .	.05	"	3.00
96.	White Pyrites, s., .	.10	"	2.50
39.	Whitneyite, ...			
567.	Wicklowite, r., . . .			
480.	Willcoxite, r., . . .			
381.	Willemite, ...	.10	"	7.50
481.	Williamsite, v., . .	.10	"	1.50
N.	Willyamite, ...			
389.	Wilsonite, r., . . .	.25	"	1.50
458.	Wilsonite, r., . . .			
370.	Wiluite, v., ...	.50	"	1.50
791.	Winebergite, r., . .			
269.	Winklerite, ap., . .			
701.	Winkworthite, r., .	.25	"	1.50
407.	Withamite, v., . . .	.50	"	2.50
279.	Witherite, ...	.10	"	6.00
137.	Wittichenite, . . .	1.00	"	2.50
333.	Wöhlerite, ...	.50	"	3.00
500.	Wolchonskoite, ap.,			
103.	Wolfachite, ...			
812.	Wolfram, s., ...	.10	"	2.00
812.	Wolframite, ...	.10	"	2.00
329.	Wollastonite, . . .	.10	"	4.00
H.	Wollongongite, . . .	.10	"	.50
212.	Wood-Opal, v., . . .	.15	"	12.00
	Wood, Silicified (Petrified), v., 210, 212,	.10	"	12.00
248.	Wood Tin, v., . .	.10	"	2.50
779.	Woodwardite, r., . .	.25	"	2.00
399.	Wörthite, v., . . .			
818.	Wulfenite, ...	.10	"	5.00
H.	Wurtzilite, ...	.25	"	1.00
69.	Wurtzite, ...	.25	"	1.25
572.	Xantharsenite, r., .			
160.	Xanthoconite, . . .	.50	"	4.00
428.	Xantholite, v., . . .			
465A.	Xanthophyllite, . .			
409.	Xanthorthite, v., . .			
260.	Xanthosiderite, . .	.25	"	1.50
784.	Xanthosiderite, s., .	.25	"	2.00
399.	Xenolite, v., ...			
536.	Xenotime, ...	.25	"	10.00
N.	Xiphonite, ...			
435.	Xonotlite, r., . . .	.50	to	2.50
435.	Xylochlore, v., . . .			
H.	Xyloretinite, . . .			
509.	Xylotile, ap., . . .			
259.	Yellow Ochre, v., . .	.05	"	.35
108.	Youngite, ap., . . .			
370.	Yttergarnet, v., . .			
405.	Yttrialite, ...	.50	"	3.00
209.	Yttrocerite, ...			
712.	Yttrogummite, r., .			
528.	Yttrotantalite, . . .	.25	"	2.00
303.	Zaratite, ...	.25	"	1.50
	Zeolites, 436–457.			
613.	Zepharovichite, . .	.50	"	2.00
619.	Zeugite, v., ...			
660.	Zeunerite, ...	.50	"	2.00
426.	Zeuxite, r., ...			
H.	Zietrisikite, ...			
173.	Zimapanite, r., . .			
12.	Zinc, ...			
805.	Zincaluminite, . . .			
58.	Zinc Blende, s., . .	.10	"	2.00
228.	Zincite, ...	.10	"	1.50
270.	Zincocalcite, v., . .			
236.	Zinc-Spinel, s., . .	.25	"	6.00
749.	Zinc Vitriol, s., . .	.50	"	2.50
289.	Zinkazurite, r., . .			
114.	Zinkenite, ...	.50	"	3.00
723.	Zinkosite, ...			
461.	Zinnwaldite, ...	.25	"	2.50
807.	Zippeite, r., ...			
N.	Zircarbite, ...			
394.	Zircon, ...	.10	"	12.50
N.	Zirkelite, ...			
264.	Zirlite, r., ...			
481.	Zöblitzite, r., . . .			
406.	Zoisite, ...	.10	"	3.00
457.	Zonochlorite, ap., .	.50	"	3.00
52.	Zorgite, ...	.50	"	2.00
369.	Zunyite, ...	.25	"	1.50
555.	Zwieselite, v., . . .			
316.	Zygadite, v., ...	.50	"	2.00

IX.

LIST OF ALL KNOWN MINERALS CLASSIFIED ACCORDING TO DANA.

("*System of Mineralogy*," Sixth Edition, 1892)

WITH COMPLETE SUPPLEMENT.

The first synopsis of Dana's *System of Mineralogy* was published in the *Naturalist's Agency Catalogue*, issued by us in 1876. Subsequently, similar lists appeared elsewhere. The original synopsis, or "Table of Species," gave in a condensed form the physical and chemical characters of species, but did not mention varieties or sub-species.

In the present numerical list, the number and name of every distinct species is given in **black type,** and following, the crystallization and the chemical composition in words and symbols. The old dualistic formula is employed, being generally preferred—*e. g.*, in comparing Stephanite, $5Ag_2S.Sb_2S_3$, with Polybasite, $9Ag_2S.Sb_2S_3$, their relationship and composition are better explained than when written Ag_5SbS_4 and Ag_9SbS_6.

The varieties and sub-species, or "related compounds," are given in *italics*. The list is intended to include all varieties of any importance, although many obscure or merely local names are omitted. The enumeration of pseudomorphs and other alterations constitutes another new and desirable feature. The Hydrocarbon compounds are briefly described.

The Supplement notices all minerals not described in the main text of Dana's *System*. The original publications were carefully reviewed and these references, dating back to the middle of 1891, are cited.

Serving as a check-list and as a useful work of reference, it is confidently hoped that this list will meet with the universal approval accorded by students to the earlier edition. The thanks of the compiler are due to Prof. E. S. Dana for valuable suggestions, kindly made during the preparation of the manuscript.

Index.—The position of any mineral in the following list may be found by referring to the Alphabetical Price List and Index in the preceding pages.

GENERAL CLASSIFICATION

FROM

The System of Mineralogy

OF

JAMES DWIGHT DANA.

Sixth Edition (1892).

By EDWARD SALISBURY DANA.

I. NATIVE ELEMENTS.

II. SULPHIDES, SELENIDES, TELLURIDES, ARSENIDES, ANTIMONIDES.

III. SULPHO-SALTS—SULPHARSENITES, SULPHANTIMONITES, SULPHOBISMUTHITES.

IV. HALOIDS—CHLORIDES, BROMIDES, IODIDES; FLUORIDES.

V. OXIDES.

VI. OXYGEN-SALTS.

1. Carbonates.
2. Silicates, Titanates.
3. Niobates, Tantalates.
4. Phosphates, Arsenates, Vanadates; Antimonates. Nitrates.
5. Borates. Uranates.
6. Sulphates, Chromates, Tellurates.
7. Tungstates, Molybdates.

VII. SALTS OF ORGANIC ACIDS—OXALATES, MELLATES, Etc.

VIII. HYDROCARBON COMPOUNDS.

NEW MINERALS—A SUPPLEMENT COMPILED FROM RECENT SCIENTIFIC LITERATURE.

I. NATIVE ELEMENTS.

I. NON-METALS.

1. CARBON GROUP.

1. Diamond. Isometric; pure carbon, C.
VARIETIES :—*Ordinary Crystals, Bort, Carbonado.*
RELATED :—*Cliftonite* (*meteoric*).
2. Graphite. Rhombohedral; pure carbon, C.
IMPURE FORMS :—*Tremenheerite, Graphitoid, Schungite.*

2. SULPHUR GROUP.

3. Sulphur. Orthorhombic; pure sulphur, S.
4. Selensulphur. Orthorhombic (?); a sulphur containing selenium.
5. Selenium. Occurrence in nature doubtful.

II. SEMI-METALS.

3. TELLURIUM-ARSENIC GROUP.

6. Selen-Tellurium. Massive; tellurium containing selenium.
7. Tellurium. Rhombohedral; tellurium, Te.
8. Arsenic. Rhombohedral; arsenic, As.
RELATED :—*Arsenolamprite.*
9. Allemontite. Rhombohedral; arsenic containing antimony.
RELATED :—*Antimonial arsenic.*
10. Antimony. Rhombohedral; antimony containing sometimes silver, iron or arsenic, Sb.
11. Bismuth. Rhomb.; pure bismuth, with occasional traces of arsenic, etc., Bi.
12. Zinc. Rhombohedral; zinc, Zn.

III. METALS.

4. GOLD GROUP.

13. Gold. Isometric; gold usually alloyed with silver, Au.
VARIETIES :—
1. *Ordinary,*
2. *Electrum* (*argentiferous*),
3. *Porpezite* (*palladium gold*),
4. *Rhodite* (*rhodium gold*),
5. *Bismuth gold.*

RELATED :—*Gold amalgam.*
14. Silver. Isometric; silver with some gold, copper, etc., Ag.
VARIETIES :—
1. *Ordinary :*
(a) *crystallized,* (c) *arborescent,* 2. *Küstelite* (*auriferous*),
(b) *filiform,* (d) *massive,* 3. *Cupriferous.*

ALTERS TO :—Cerargyrite, Argentite, Red Silver Ore, Stephanite.
15. Copper. Isom.; pure copper often containing some silver, bismuth, etc., Cu.
ALTERS TO :—Cuprite, Azurite, Malachite.
16. Mercury. Liquid; pure mercury with sometimes a little silver, Hg.
17. Amalgam. Isometric; silver containing mercury.
VARIETIES :—1. *Ordinary Amalgam,* 2. *Arquerite,* 3. *Kongsbergite.*
18. Lead. Isometric; nearly pure lead, Pb.
19. Tin. Rounded grains; nearly pure tin, Sn.

5. PLATINUM—IRON GROUP.

20. Platinum. Isom.; platinum alloyed with iron, iridium, etc., Pt.
VARIETIES :—1. *Non-magnetic (ordinary)*, 2. *Magnetic.*
21. Iridium. Isometric; iridium; Ir. with platinum.
22. Iridosmine. Rhombohedral; iridium with osmium.
VARIETIES :—1. *Nevyanskite*, 2. *Siserskite.*
23. Palladium. Isometric; palladium alloyed with platinum and iridium, Pd.
24. Allopalladium. Rhombohedral; palladium, Pd.
25. Iron. Isom.; generally about 90 per cent. pure iron, with nickel, cobalt, etc.
VARIETIES :—

1. *Terrestrial* :—
(a) *nearly pure (Greenland)*,
(b) *nickeliferous, awaruite.*

2. *Meteoric* :—
(a) *Siderites*,
(b) *Siderolites*,
(c) *Meteoric Stones.*

IRON COMPOUNDS FROM METEORIC IRONS :—*Edmonsonite, Chalypite, Cohenite, Schreibersite, Rhabdite.*

II. SULPHIDES, SELENIDES, TELLURIDES, ARSENIDES, ANTIMONIDES.

I. SULPHIDES, SELENIDES, TELLURIDES OF THE SEMI-METALS.

1. REALGAR GROUP. RS. Monoclinic.

26. Realgar. Monoclinic; arsenic monosulphide, AsS.
ALTERS TO :—Orpiment, Arsenolite.

2. STIBNITE GROUP. R_2S_3. Orthorhombic.

27. Orpiment. Orthorhomic (?); arsenic trisulphide, As_2S_3.
RELATED :—*Dimorphite.*
28. Stibnite. Orthorhombic; antimony trisulphide, Sb_2S_3.
RELATED :—*Metastibnite.*
29. Bismuthinite. Orthorhombic; bismuth trisulphide, Bi_2S_3.
RELATED :—*Bolivite.*
30. Guanajuatite. Orthorhombic; bismuth selenide, Bi_2Se_3.
RELATED :—*Silaonite.*
31. Tetradymite. Rhombohedral; bismuth and tellurium.
VARIETIES :—1. *Free from Sulphur*, 2. *Sulphurous.*
32. Joseite. Laminated; bismuth and tellurium with some sulphur and selenium.
33. Wehrlite. Foliated; bismuth and tellurium with some sulphur and silver.

3. MOLYBDENITE GROUP.

34. Molybdenite. Hexagonal (?); molybdenum disulphide, MoS_2.

II. SULPHIDES, SELENIDES, TELLURIDES, ARSENIDES, ANTIMONIDES OF THE METALS.

A. BASIC DIVISION.

35. Dyscrasite. Orthorhombic; a silver antimonide.
ALTERS TO :—Pyrargyrite, Silver.
RELATED :—*Arsenical Silver, Macfarlanite, Huntilite, Animikite, Arsenargentite.*
36. Horsfordite. Massive; copper antimonide, Cu_6Sb.(?)
37. Domeykite. Massive; copper arsenide, Cu_3As.
RELATED :—*Condurrite, Orileyite.*
38. Algodonite. Massive; copper arsenide, Cu_6As.

39. Whitneyite. Massive; copper arsenide, Cu_9As.
40. Chilenite. Amorphous; silver bismuthide, perhaps Ag_6Bi.
41. Stützite. Hexagonal(?); a silver telluride, perhaps Ag_4Te.

B. MONOSULPHIDES, SELENIDES, TELLURIDES, ETC.

1. GALENA GROUP.—RS. Isometric, holohedral.

42. Argentite. Isometric; silver sulphide, Ag_2S.
RELATED :—*Jalpaite.*
43. Hessite. Isometric; silver telluride, Ag_2Te.
44. Petzite. Massive; a silver and gold telluride, $(Ag,Au)_2Te$.
45. Galena. Isometric; lead sulphide, PbS.

VARIETIES :—

1. *Ordinary :—*
   (a) *Crystallized,*
   (b) *Fibrous,*
   (c) *Cleavable,*
   (d) *Granular,*
   (e) *Cryptocrystalline,*
2. *Argentiferous,*
3. *Targionite,*
4. *Johnstonite,*
5. *Bleischweif,*
6. *Steinmannite.*

ALTERS TO :—Minium, Cerussite, Wulfenite, Chalcocite, Quartz, Pyrite, Calamine, Anglesite, Pyromorphite, Tetrahedrite, Rhodochrosite, Limonite, Pistomesite.
RELATED :—*Huascolite, Alisonite, Cuproplumbite.*
46. Altaite. Isometric; lead telluride, PbTe.
RELATED :—*Henryite.*
47. Clausthalite. Isometric; lead selenide, PbSe.
VARIETIES :—1. *Ordinary,* 2. *Tilkerodite* (*cobaltiferous*).
48. Naumannite. Isom.; silver selenide, Ag_2Se, or lead and silver $(Ag_2,Pb)Se$.
49. Berzelianite. Massive; copper selenide, Cu_2Se.
50. Lehrbachite. Massive; lead and mercury selenide, PbSe with Hg_2Se.
51. Eucairite. Isometric; copper and silver selenide, $Cu_2Se.Ag_2Se$.
52. Zorgite. Massive; copper and lead selenide in varying proportion.
53. Crookesite. Massive; copper and thallium selenide, with silver, $(Cu,Tl,Ag)_2Se$.

2. CHALCOCITE GROUP. RS. Orthorhombic.

54. Chalcocite. Orthorhombic; cuprous sulphide, Cu_2S.
ALTERS TO :—Chalcopyrite, Covellite, Bornite, Melaconite.
RELATED :—*Harrisite.*
55. Stromeyerite. Orthorhombic; silver and copper sulphide, $(Ag,Cu)_2S$.
56. Sternbergite. Orthorhombic; silver and iron sulphide, $AgFe_2S_3$.
VARIETIES :—1. *Sternbergite,* 2. *Friescite.*
RELATED :—*Argentopyrite, Argyropyrite.*
57. Acanthite. Orthorhombic; silver sulphide, Ag_2S.
RELATED :—*Daleminzite.*

3. SPHALERITE GROUP. RS. Isometric, tetrahedral.

58. Sphalerite. Isometric; zinc sulphide, ZnS.

VARIETIES :—

1. *Ordinary :—*
   (a) *brown or black,*
   (b) *Cleiophane,*
   (c) *Ruby Blende.*
2. *Ferriferous :—*
   (a) *Marmatite,*
   (b) *Christophite.*
3. *Cadmiferous :—* (*Pribramite.*)
4. *Mercurial.*
5. *Stanniferous.*

59. Metacinnabarite. Isometric; mercuric sulphide, HgS.
RELATED :—*Guadalcazarite, Leviglianite.*
60. Tiemannite. Isometric; mercuric selenide, HgSe.
61. Onofrite. Massive; mercury sulpho-selenide, Hg(S,Se).
62. Coloradoite. Massive; mercuric telluride, HgTe.
63. Alabandite. Isometric; manganese sulphide, MnS.
64. Oldhamite. Isometric; calcium sulphide, CaS. (meteoric).
RELATED :—*Osbornite* (*meteoric*).
65. Pentlandite. Isometric; iron and nickel sulphide, (FeNi)S.

4. CINNABAR—WURTZITE—MILLERITE GROUP. Rhombohedral or Hexagonal.

66. Cinnabar. Rhombohedral; mercuric sulphide, HgS.

VARIETIES :—

1. *Ordinary* :— (a) *Crystallized,* (b) *Massive,* (c) *Earthy,* 2. *Hepatic.*

67. Covellite. Hexagonal; cupric sulphide, CuS.
RELATED :—*Cantonite.*

68. Greenockite. Hexagonal; cadmium sulphide, CdS.

69. Wurtzite. Hexagonal; zinc sulphide, ZnS.
RELATED :—*Erythrozincite.*

70. Millerite. Rhombohedral; nickel sulphide, NiS.
RELATED :—*Jaipurite.*

71. Niccolite. Hexagonal; nickel arsenide, NiAs.

72. Breithauptite. Hexagonal; nickel antimonide, NiSb.

73. Troilite. Massive; iron sulphide, FeS (meteoric).

74. Pyrrhotite. Hexagonal; iron sulphide, containing sometimes 5 per cent. nickel, $Fe_{11}S_{12}$.
ALTERS TO :—Pyrite, Siderite, Limonite.
RELATED :—*Kroeberite, Horbachite.*

C. INTERMEDIATE DIVISION.

GROUP 1.

75. Polydymite. Isometric; nickel sulphide, Ni_4S_5(?).
RELATED :—*Grünauite.*

76. Beyrichite. Prismatic; a nickel sulphide, Ni_3S_4(?).

77. Melonite. Hexagonal; a nickel telluride, Ni_2Te_3(?).

GROUP 2.

78. Bornite. Isometric; copper and iron sulphide, Cu_3FeS_3, varying.
RELATED :—*Castillite.*

79. Linnæite. Isometric; cobalt sulphide, Co_3S_4.
VARIETIES :—1. *Ordinary,* 2. *Siegenite.*

80. Daubreelite. Massive; chromium and iron sulphide, $FeS.Cr_2S_3$.

81. Cubanite. Isometric; iron and copper sulphide, $CuFe_2S_4$.
RELATED :—*Chalcopyrrhotite.*

82. Carrollite. Isometric; copper and cobalt sulphide, $CuS.Co_2S_3$.

83. Chalcopyrite. Tetragonal; copper and iron sulphide, $CuFeS_2$, varying.
ALTERS TO :—Malachite, Chrysocolla, Chalcocite, Tetrahedrite, Covellite, Melaconite, Iron oxide, Sulphate.
RELATED :—*Barnhardite, Homichlin, Ducktownite.*

84. Stannite. Massive; tin, copper, iron, and often zinc sulphide, perhaps $Cu_2S.FeS.SnS_2$.

D. DISULPHIDES, DIARSENIDES, ETC.

1. PYRITE GROUP. RS_2, RAs_2, RSb_2. Isometric, pyritohedral.

85. Pyrite. Isometric; iron disulphide, FeS_2(?).
ALTERS TO :—Limonite, Green vitriol, Göthite, Hematite, Quartz, Graphite.

86. Hauerite. Isometric; manganese disulphide, MnS_2.

87. Smaltite. Isometric; cobalt diarsenide, $CoAs_2$.
NOTE.—Smaltite and Chloanthite graduate chemically into each other.

88. Chloanthite. Isometric; nickel diarsenide, $NiAs_2$.

89. Cobaltite. Isometric; cobalt sulph-arsenide, $CoS_2.CoAs_2$.
VARIETIES :—1. *Ordinary,* 2. *Ferrocobaltite.*

90. Gersdorffite. Isometric; nickel sulph-arsenide, $NiS_2.NiAs_2$.
RELATED :—*Sommarugaite, Tombazite.*

91. Corynite. Isometric; nickel sulph-antimon-arsenide, Ni(As,Sb)S.

92. Ullmannite. Isometric; nickel sulph-antimonide, $NiS_2.NiSb_2$.

93. Sperrylite. Isometric; platinum arsenide, $PtAs_2$.

94. Laurite. Isometric; ruthenium sulphide (and osmium 3.03 per cent.), RuS_2.

95. Skutterudite. Isometric; cobalt arsenide, $CoAs_3$.

2. MARCASITE GROUP. RS_2, Etc. Orthorhombic.

96. Marcasite. Orthorhombic; iron sulphide, FeS_2.

VARIETIES :—

1. *Radiated,* 4. *Capillary Pyrites,* 7. *Arsenical,*
2. *Cockscomb Pyrites,* 5. *Hepatic,* 8. *Stalactitic.*
3. *Spear Pyrites,* 6. *Cellular,*

ALTERS TO :—Limonite, Bournonite, Magnetite, Pyrite, Chalcopyrite, Sphalerite.

97. Löllingite. Orthorhombic; iron diarsenide, $FeAs_2$.

VARIETIES :—

1. *Löllingite,* 2. *Leucopyrite,* 3. *Geyerite,* 4. *Glaucopyrite, cobaltiferous.*

RELATED :—*Pacite.*

98. Arsenopyrite. Orthorhombic; iron sulph-arsenide, FeAsS.
VARIETIES :—1. *Ordinary,* 2. *Danaite* (*cobaltiferous*), 3. *Niccoliferous.*
RELATED :—*Crucite.*

99. Safflorite. Orthorhombic; cobalt diarsenide, $CoAs_2$.

100. Rammelsbergite. Orthorhombic; essentially nickel diarsenide, $NiAs_2$.

101. Glaucodot. Orthorhombic; cobalt and iron sulph-arsenide, (CoFe)AsS.

102. Alloclasite. Orthorh.; cobalt (and iron) sulph-arsen-bismuthide, Co(As,Bi)S.

103. Wolfachite. Orthorhombic; probably Ni(As,Sb)S.

3. SYLVANITE GROUP.

104. Sylvanite. Monoclinic; gold and silver telluride, $(AuAg)Te_2$.
RELATED :—*Müllerine.*

105. Krennerite. Orthorhombic; a gold and silver telluride.
RELATED :—*Calaverite.*

106. Nagyagite. Orthorhombic; lead and gold sulpho-telluride, with antimony.
RELATED :—*Silberphyllinglanz.*

OXYSULPHIDES.

107. Kermesite. Monoclinic; antimony oxysulphide, $2Sb_2S_3.Sb_2O_3$.

108. Voltzite. Globules; zinc oxysulphide, Zn_5S_4O.

APPENDIX TO SULPHIDES, ETC.

Arsenotellurite, *Plakodin,* *Plumbostannite,*
Bolivianite, *Copper and Silver Sulphide,* *Valleriite,*
Kaneite, *Plumbomanganite,* *Youngite.*

III. SULPHO-SALTS.

I. SULPHARSENITES, SULPHANTIMONITES, ETC.

A. ACIDIC DIVISION.

109. Livingstonite. Prismatic (?); mercury; sulph-antimonite, $HgS.2Sb_2S_3$.

110. Guejarite. Orthorhombic; copper sulphantimonite, $Cu_2S.2Sb_2S_3$.

111. Chiviatite. Foliated; lead sulpho-bismuthite, $2PbS.3Bi_2S_3$.

112. Cuprobismutite. Prismatic crystals; copper sulpho-bismuthite, $3Cu_2S.4Bi_2S_3$.
RELATED :—*Dognacskaite.*

113. Rezbanyite. Massive; lead sulpho-bismuthite, $4PbS.5Bi_2S_3$.

B. META-DIVISION.

ZINKENITE GROUP. $RS(As,Sb,Bi)_2S_3$. Orthorhombic.

114. Zinkenite. Orthorhombic; lead sulphantimonite, $PbS.Sb_2S_3$.

115. Sartorite. Orthorhombic; lead sulpharsenite, $PbS.As_2S_3$.

116. Emplectite. Orthorhombic; copper sulphobismuthite, $Cu_2S.Bi_2S_3$.
117. Chalcostibite. Orthorhombic; copper sulphantimonite, $Cu_2S.Sb_2S_3$.
118. Galenobismutite. Columnar; lead sulphobismuthite, $PbS.Bi_2S_3$.
VARIETIES:—1. *Ordinary*, 2. *Argentiferous* (*Alaskaite*), 3. *Seleniferous.*
119. Berthierite. Prismatic; iron sulphantimonite, $FeS.Sb_2S_3$. (?)
120. Matildite. Prismatic; silver sulphobismuthite, $Ag_2S.Bi_2S_3$.
RELATED:—*Plenargyrite.*
121. Miargyrite. Monoclinic; silver sulphantimonite, $Ag_2S.Sb_2S_3$.

C. INTERMEDIATE DIVISION.

122. Plagionite. Monoclinic; lead sulphantimonite, $5PbS.4Sb_2S_3$ (?).
123. Binnite. Isometric; copper sulpharsenite, $3Cu_2S.2As_2S_3$ (?).
124. Klaprotholite. Orthorhombic; copper suphobismuthite, $3Cu_2S.2Bi_2S_3$.
125. Schirmerite. Massive; lead and silver sulphobismuthite, $3(Ag_2,Pb)S.2Bi_2S_3$.
126. Warrenite. Acicular; lead sulphantimonite, $3PbS.2Sb_2S_3$.

JAMESONITE GROUP. $2RS.(As,Sb,Bi)_2S_3$. Orthorhombic.

127. Dufrenoysite. Orthorhombic; lead sulpharsenite, $2PbS.As_2S_3$.
128. Cosalite. Orthorhombic; lead sulphobismuthite, $2PbS.Bi_2S_3$.
129. Schapbachite. Orthorhombic (?); lead and silver sulphobismuthite, $PbS.Ag_2S.Bi_2S_3$.
130. Jamesonite. Orthorhombic; lead sulphantimonite, $2PbS.Sb_2S_3$.
ALTERS TO:—Bindheimite.
131. Kobellite. Massive; lead sulphantimon-bismuthite, $2PbS.(Bi,Sb)_2S_3$.
132. Brongniardite. Isom.; lead and silver, sulphantimonite, $PbS.Ag_2S.Sb_2S_3$.
133. Semseyite. Monoclinic; lead sulphantimonite, $7PbS.3Sb_2S_3$. (?)
134. Diaphorite. Orthorh.; lead and silver sulphantimonite, $5(Pb,Ag_2)S.2Sb_2S_3$.
135. Freieslebenite. Monoc.; lead and silver sulphantimonite, $5(Pb,Ag_2)S.2Sb_2S_3$.

D. ORTHO DIVISION.

BOURNONITE GROUP. $3RS.(As,Sb,Bi)_2S_3$. Orthorhombic.

136. Bournonite. Orthorh.; lead and copper sulphantimonite, $3(Pb,Cu_2)S.Sb_2S_3$.
ALTERS TO:—Cerussite, Azurite, Malachite, Wölchite.
137. Wittichenite. Orthorhombic; copper sulphobismuthite, $3Cu_2S.Bi_2S_3$.
138. Aikinite. Orthorh.; lead and copper sulphobismuthite, $3(Pb,Cu_2)S.Bi_2S_3$.
139. Boulangerite. Massive; lead sulphantimonite, $3PbS.Sb_2S_3$.
140. Lillianite. Massive; lead sulphobismuthite, $3PbS.Bi_2S_3$.
141. Stylotypite. Orthorhombic; copper, silver, and iron sulphantimonite, $3(Cu_2,Ag_2,Fe)S.Sb_2S_3$.
RELATED:—*Dürfeldtite.*
142. Guitermanite. Massive; lead sulpharsenite, $10PbS.3As_2S_3$.
143. Tapalpite. Massive; bismuth and silver sulpho-telluride, $3Ag_2(S,Te).Bi_2(S,Te)_3$ (?).

PYRARGYRITE GROUP. $3Ag_2S.(As,Sb)_2S_3$. Rhombohedral, hemimorphic.

144. Pyrargyrite. Rhombohedral; silver sulphantimonite, $3Ag_2S.Sb_2S_3$.
ALTERS TO:—Argentite.
145. Proustite. Rhombohedral; silver sulpharsenite, $3Ag_2S.As_2S_3$.
146. Pyrostilpnite. Monoclinic; silver sulphantimonite, $3Ag_2S.Sb_2S_3$.
147. Rittingerite. Monoclinic; arsenic, selenium, and silver.

E. BASIC DIVISION.

TETRAHEDRITE GROUP. $4RS.(Sb,As)_2S_3$. Isometric, tetrahedral.

148. Tetrahedrite. Isometric; copper sulphantimonite, $4Cu_2S.Sb_2S_3$.
VARIETIES:—
1. *Ordinary*,
2. *Argentiferous* (*Freibergite*),
3. *Mercurial* (*Schwatzite*),
4. *Plumbiferous.*

ALTERS TO:—Chalcopyrite, Malachite, Azurite, Amalgam, Bournonite, Erythrite. Cinnabar, Covellite.
NOTE.—Tetrahedrite and Tennantite graduate chemically into each other.

149. Tennantite. Isometric; copper sulpharsenite, 4 $CuS.As_2S_3$.
VARIETIES:—1. *Ordinary*, 2. *Sandbergerite*, 3. *Fredricite*, 4. *Rionite*, 5. *Annivite*.
RELATED:—*Nepaulite, Fieldite, Polytelite, Clayite.*
150. Jordanite. Orthorhombic; lead sulpharsenite, $4PbS.As_2S_3$.
151. Meneghinite. Orthorhombic; lead sulphantimonite, $4PbS.Sb_2S_3$.
152. Geocronite. Orthorhombic; lead sulphantimonite, $5PbS.Sb_2S_3$.
153. Stephanite. Orthorhombic; silver sulphantimonite, $5Ag_2S.Sb_2S_3$.
ALTERS TO:—Silver.
154. Kilbrickenite. Massive; lead sulphantimonite, perhaps $6PbS.Sb_2S_3$.
155. Beegerite. Isometric (?); lead sulphobismuthite, $6PbS.Bi_2S_3$.
RELATED:—*Richmondite.*
156. Polybasite. Orthorhombic; silver sulphantimonite, $9Ag_2S.Sb_2S_3$.
ALTERS TO:—Stephanite, Pyrite.
157. Polyargyrite. Isometric; silver sulphantimonite, $12Ag_2S.Sb_2S_3$.

II. SULPHARSENATES, SULPHANTIMONATES, ETC.

ENARGITE GROUP.

158. Enargite. Orthorhombic; copper sulpharsenate, $3Cu_2S.As_2S_5$.
RELATED:—*Lautite, Clarite, Luzonite.*
NOTE.—Enargite and Famatinite graduate chemically toward each other.
159. Famatinite. Orthorhombic; copper sulphantimonate, $3Cu_2S.Sb_2S_5$.
160. Xanthoconite. Rhombohedral; silver sulpharsenate, $3Ag_2S.As_2S_5$.
161. Epiboulangerite. Orthorhombic (?); lead sulphantimonate, $3PbS.Sb_2S_5$.
162. Epigenite. Orthorh.; copper and iron sulpharsenate, $4Cu_2S.{}_3FeS.As_2S_5$(?).
RELATED:—*Regnolite.*
163. Argyrodite. Monoclinic; silver and germanium sulphide, $3\ Ag_2S.GeS_2$.

IV. HALOIDS.—CHLORIDES, BROMIDES, IODIDES, FLUORIDES.

I. ANHYDROUS CHLORIDES, BROMIDES, IODIDES; FLUORIDES.

CALOMEL GROUP. $\overset{I}{R}_2Cl_2$.

164. Calomel. Tetragonal; mercurous chloride, Hg_2Cl_2.
RELATED:—*Mercuric chloride.*
165. Nantokite. Isometric; cuprous chloride, Cu_2Cl_2.

HALITE GROUP. $\overset{I}{R}Cl$, etc. Isometric.

166. Halite. Isometric; sodium chloride, NaCl.
ALTERS TO:—Anhydrite, Polyhalite, Dolomite, Hematite, Gypsum, Celestite, Quartz, Pyrite.
RELATED:—*Martinsite, Hydrohalite, Huantajayite.*
167. Sylvite. Isometric; potassium chloride, KCl.
168. Sal-ammoniac. Isometric; ammonium chloride, NH_4Cl.
169. Cerargyrite. Isometric; silver chloride, AgCl.
RELATED:—*Bordosite.*
170. Embolite. Isometric; silver chlorobromide, Ag(Cl,Br).
171. Bromyrite. Isometric; silver bromide, AgBr.
172. Iodobromite. Isometric; silver chloroiodobromide, 2AgCl.2AgBr.AgI.
173. Iodyrite. Hexagonal; silver iodide, AgI.
RELATED:—*Tocornalite, Zimapanite, Zinc Iodide, Coccinite, Bustamentite, Zinc Bromide.*

FLUORITE GROUP.—$\overset{II}{R}(Cl,F)_2$. Isometric.

174. Hydrophilite. Isometric; calcium chloride, $CaCl_2$.

175. Fluorite. Isometric; calcium fluoride, CaF_2.

VARIETIES :—

1. *Ordinary* :—
   (a) *cleavable to crystallized in many colors,*
   (b) *fibrous,*
   (c) *granular,*
   (d) *earthy.*
2. *Antozonite.*

ALTERS TO :—Quartz, Hematite, Psilomelane, Smithsonite, Kaolinite, Limonite, Lithomarge, Calamine, Cerussite, Calcite.

RELATED :—*Bruiachite, Gunnisonite.*

176. Chloromagnesite. A deliquescent mass; magnesium chloride, $MgCl_2$.

177. Sellaite. Tetragonal; magnesium fluoride, MgF_2.

178. Lawrencite. A deliquescent mass; ferrous chloride, $FeCl_2$.

179. Scacchite. A deliquescent mass; manganese protochloride, $MnCl_2$.

RELATED :—*Chloralluminite.*

180. Cotunnite. Orthorhombic; lead chloride, $PbCl_2$.

RELATED :—*Pseudocotunnite.*

181. Molysite. Incrusting; ferric chloride, $FeCl_3$.

182. Tysonite. Hexagonal; fluoride of cerium metals, $(Ce,La,Di)F_3$.

ALTERS TO :—Bastnäsite.

183. Cryolite. Monoclinic; sodium and aluminium fluoride, Na_3AlF_6.

RELATED :—*Elpasolite.*

184. Chiolite. Tetragonal; aluminium and sodium fluoride, $5NaF.3AlF_3$.

RELATED :—*Chodneffite.*

185. Hieratite. Isometric; potassium and silicon fluoride, $2KF.SiF_4$.

RELATED :—*Hydrofluorite, Cryptohalite, Proidonite.*

II. OXYCHLORIDES, OXYFLUORIDES.

A. OXYCHLORIDES.

186. Matlockite. Tetragonal; lead oxychloride, $PbCl_2.PbO$.

187. Mendipite. Orthorhombic; lead oxychloride, $PbCl_2.2PbO$.

188. Schwartzembergite. Rhombohedral; lead oxychloroiodide, $Pb(I,Cl)_2,2PbO(?)$.

189. Laurionite. Orthorhombic; basic lead chloride, $PbCl_2.Pb(OH)$.

190. Daviesite. Orthorhombic; lead oxychloride.

191. Fiedlerite. Monoclinic; lead oxychloride.

192. Percylite. Isometric; hydrated lead and copper oxychloride, $PbCuO_2H_2Cl_2(?)$.

193. Atacamite. Orthorhombic; hydrous copper oxychloride, $CuCl_2.3Cu(OH)_2$.

ALTERS TO :—Malachite, Chrysocolla.

RELATED :—*Tallingite, Erythrocalcite, Melanothallite, Atelite.*

194. Daubréeite. Amorphous; a hydrated bismuth oxychloride, $2Bi_2O_3.BiCl_3 3H_2O(?)$.

B. OXYFLUORIDES.

195. Nocerite. Hexagonal; a calcium and magnesium oxyfluoride, $2(Ca,Mg)F_2.(Ca,Mg)O(?)$.

RELATED:—*Fluosiderite, Pseudonocerina.*

196. Fluocerite. Massive; oxyfluoride of cerium and yttrium metals, $(Ce,La,Di,Y,Er,Yt)_2OF_4$.

A. HYDROUS CHLORIDES.

197. Bischofite. Granular; hydrous magnesium chloride, $MgCl_2 + 6H_2O$.

198. Kremersite. Isometric; hydrous potassium, ammonium and iron chloride, $KCl.NH_4Cl.FeCl_3 + H_2O$.

199. Erythrosiderite. Orthorhombic; hydrous potassium and iron chloride, $2KCl.FeCl_3.H_2O$.

200. Douglasite. Hydrous potassium and iron chloride, $2KCl.FeCl_2.2H_2O(?)$.

201. Carnallite. Orthorhombic; hydrous potassium and magnesium chloride, $KCl.MgCl_2 + 6H_2O$.

202. Tachhydrite. Rhombohedral; hydrous calcium and magnesium chloride, $CaCl_2.2MgCl_2 + 12H_2O$.

203. Fluellite. Orthorhombic; a hydrous aluminium fluoride, $AlF_3 + H_2O$.

204. Prosopite. Monoc.; a hydrous alum. and calcium fluoride, $CaF_2.2Al(F,OH)_3$.

205. Pachnolite. Monoclinic; a hydrous aluminium, calcium and sodium fluoride, $NaF.CaF_2.AlF_3.H_2O$.

206. Thomsenolite. Monoclinic; hydrous aluminium, calcium and sodium fluoride, $NaF.CaF_2.AlF_3.H_2O$.

Related :—*Hagemannite.*

207. Gearksutite. Masses of minute needles; perhaps a hydrous calcium and aluminium fluoride, $CaF_2.Al(F,OH)_3H_2O$.

208. Ralstonite. Isometric; a hydrous sodium and aluminium fluoride, $(Na_2,Mg)F_2.3Al(F,OH)_3.2H_2O$.

209. Yttrocerite. Massive; a calcium fluoride with the cerium and yttrium metals, $2(2[Ce,La,Di,Y,Er]F_3.9CaF_2. + 3H_2O$.

V. OXIDES.

I. OXIDES OF SILICON.

210. Quartz. Rhombohedral; silicon dioxide, SiO_2.

A. Phenocrystalline or Vitreous Varieties :—

1. *Rock Crystal* :—
   (a) *Cavernous,*
   (b) *Capped,*
   (c) *Drusy,*
   (d) *Radiated,*
   (e) *Fibrous.*
2. *Star-quartz (asteriated),*
3. *Amethyst,*
4. *Rose-quartz,*
5. *Citrine (yellow),*
6. *Smoky-quartz,*
7. *Milky-quartz,*
8. *Sapphire-quartz,*
9. *Aventurine,*
10. *Containing liquids with moving bubble,*
11. *Sagenitic, containing:*—
    (a) *Rutile,*
    (b) *Black Tourmaline,*
    (c) *Göthite,*
    (d) *Stibnite,*
    (e) *Asbestus,*
    (f) *Actinolite,*
    (g) *Hornblende,*
    (h) *Epidote.*
12. *Cat's-Eye,*
13. *Tiger-Eye,*
14. *Impure from Minerals* :—
    (a) *Ferruginous,*
    (b) *Chloritic,*
    (c) *Actinolitic,*
    (d) *Micaceous,*
    (e) *Arenaceous.*

B. Cryptocrystalline Varieties :—

1. *Chalcedony,*
2. *Carnelian,*
3. *Chrysoprase,*
4. *Prase,*
5. *Plasma,*
6. *Blood-stone (Heliotrope),*
7. *Agate* :—
   (a) *Banded,*
   (b) *Fortification,*
   (c) *Moss.*
8. *Onyx,*
9. *Sardonyx,*
10. *Agate—Jasper,*
11. *Siliceous Sinter,*
12. *Flint,*
13. *Hornstone (Chert),*
14. *Touchstone,*
15. *Jasper* :—
    (a) *Red,*
    (b) *Brownish,*
    (c) *Dark green,*
    (d) *Grayish blue,*
    (e) *Blackish,*
    (f) *Riband Jasper,*
    (g) *Egyptian Jasper,*
    (h) *Jasponyx,*
    (i) *Jasperized wood.*

Other Varieties :—

1. *Granular-quartz,*
2. *Quartzose Sandstone,*
3. *Quartz Conglomerate,*
4. *Flexible Sandstone,*
5. *Buhrstone,*
6. *Cotterite.*
7. *Pseudomorphous Quartz* :—
   (a) *Tabular-quartz,*
   (b) *Haytorite,*
   (c) *Babel-quartz,*
   (d) *Silicified shells,*
   (e) *Silicified wood,*
   (f) *Beekite.*

Alters to :—Pyrite, Magnetite, Voltzite, Cassiterite, Hematite.

211. Tridymite. Hexagonal (?); pure silica, SiO_2.

Related :—

Asmanite,
Cristobalite,
Granuline,
Melanophlogite,
Sulfuricin,
Vestan,
Jenzschite,
Passyite.

212. Opal. Amorphous; silica, with varying amount of water, $SiO_2.nH_2O$.

VARIETIES :—

1. *Precious Opal,*
2. *Fire-opal,*
3. *Girasol,*
4. *Common Opal:*—
   (a) *Milk-opal,*
   (b) *Resin-opal,*
   (c) *Green,*
   (d) *Brick-red,*
   (e) *Hydrophane,*
   (f) *Forcherite.*
5. *Cacholong,*
6. *Opal-agate,*
7. *Menilite,*
8. *Jasp-opal,*
9. *Wood-opal,*
10. *Hyalite,*
11. *Fiorite:*—
    (a) *Pearl-sinter,*
    (b) *Michaelite,*
    (c) *Geyserite.*
12. *Float-stone,*
13. *Tripolite:*—
    (a) *Infusorial Earth,*
    (b) *Randannite,*
    (c) *Tripoli Slate,*
    (d) *Alumocalcite.*

RELATED :—*Lussatite, Tabasheer.*

II. OXIDES OF THE SEMI-METALS; also MO and W.

1. ARSENOLITE GROUP. R_2O_3. Isometric.

213. Arsenolite. Isometric; arsenic trioxide, As_2O_3.
214. Senarmontite. Isometric; antimony trioxide, Sb_2O_3.
ALTERS TO :—Stibnite.

2. VALENTINITE GROUP. R_2O_3.

215. Claudetite. Monoclinic; arsenic trioxide. As_2O_3.
216. Valentinite. Orthorhombic; antimony trioxide, Sb_2O_3.
217. Bismite. Orthorhombic; bismuth trioxide, Bi_2O_3.
RELATED :—*Karelinite, Tantalic Ocher, Vanadic Ocher.*

3. TELLURITE GROUP. RO_2. Orthorhombic.

218. Tellurite. Orthorhombic; tellurium dioxide, TeO_2.
RELATED :—*Selenolite.*

4. MOLYBDITE GROUP.

219. Molybdite. Orthorhombic; molybdenum trioxide, MoO_3.
RELATED :—*Ilsemannite.*
220. Tungstite. Orthorhombic; tungsten trioxide, WO_3.
RELATED :—*Meymacite.*
221. Cervantite. Orthorhombic; antimony dioxide, $Sb_2O_3.Sb_2O_5$.
222. Stibiconite. Massive; a hydrous antimony dioxide, $Sb_2O_4.H_2O$(?).
RELATED :—*Volgerite, Stibianite, Partzite, Rivotite, Stibioferrite, Stetefeldtite.*

III. OXIDES OF THE METALS.

A. ANHYDROUS OXIDES.

I. PROTOXIDES. R_2O and RO.

223. Water. Hydrogen oxide, H_2O.

STATES OF EXISTENCE :—
1. *Solid, Ice (hexagonal);* 2. *Liquid, Water;* 3. *Gas, Steam and Aqueous Vapor.*

224. Cuprite. Isometric; cuprous oxide, Cu_2O.

VARIETIES :—

1. *Ordinary:*—
   (a) *crystallized,*
   (b) *massive,*
2. *Chalcotrichite,*
3. *Tile Ore.*

ALTERS TO :—Native copper, Malachite, Azurite, Chrysocolla, Melaconite, Limonite.
RELATED :—*Hydrocuprite.*

PERICLASE GROUP. RO. Isometric.

225. Periclase. Isometric; magnesium oxide, MgO.
226. Manganosite. Isometric; manganese protoxide, MnO.
227. Bunsenite. Isometric; nickel protoxide, NiO.
228. Zincite. Hexagonal; zinc oxide, ZnO.
RELATED :—*Calcozincite.*
229. Massicot. Massive; lead monoxide, PbO.
230. Tenorite. Monoclinic; cupric oxide, CuO.
VARIETIES :—1. *Ordinary*, 2. *Melaconite.*
RELATED :—*Marcylite, Lime, Palladinite.*

II. SESQUIOXIDES. R_2O_3.

HEMATITE GROUP. Rhombohedral.

231. Corundum. Rhombohedral; alumina, Al_2O_3.
VARIETIES :—1. *Sapphire*, 2. *Ruby*, 3. *Emery*, 4. *Corundum.*
232. Hematite. Rhombohedral; iron sesquioxide, Fe_2O_3.

VARIETIES :—

1. *Specular* :—
   (a) *Crystallized*,
   (b) *Micaceous*,
   (c) *Massive.*
2. *Compact Columnar*,
3. *Red Ocherous*,
4. *Clay Iron-stone.*

ALTERS TO :—Magnetite, Siderite, Pyrite, Limonite.
RELATED :—*Martite, Raphisiderite.*
233. Ilmenite. Rhombohedral; an iron and titanium oxide, generally $FeTiO_3$.

VARIETIES :—

1. *Kibdelophane*,
2. *Crichtonite*,
3. *Ilmenite*,
4. *Menaccanite*,
5. *Hystatite*,
6. *Washingtonite*,
7. *Uddevallite*,
8. *Eisenrosen*,
9. *Kragerö hematite*,
10. *Magnesian*,
11. *Paracolumbite.*

RELATED :—*Hydroilmenite, Ferrozincite, Iserine.*

III. INTERMEDIATE OXIDES.

SPINEL GROUP. $\overset{II}{RO}.\overset{III}{R_2O_3}$. Isometric.

234. Spinel. Isometric; magnesium aluminate, $MgO.Al_2O_3$.

VARIETIES :—

1. *Ordinary*, 2. *Ruby Spinel*, 3. *Ceylonite*, 4. *Chlorospinel*, 5. *Picotite.*

ALTERS TO :—Steatite, Serpentine, Hydrotalcite, Mica.
235. Hercynite. Isometric; iron aluminate, $FeAl_2O_4$.
236. Gahnite. Isometric; zinc aluminate, $ZnAl_2O_4$.
VARIETIES :—1. *Automolite*, 2. *Dysluite*, 3. *Kreittonnite.*
237. Magnetite. Isometric; iron sesquioxide and iron protoxide, $FeO.Fe_2O_3$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Crystals*,
   (b) *Massive*,
   (c) *Loose sand*,
   (d) *Lodestone.*
2. *Magnesian*,
3. *Niccoliferous*,
4. *Titaniferous*,
5. *Manganmagnetite*,
6. *Ocherous.*

RELATED :—*Nickel Oxide.*
238. Magnesioferrite. Isometric; magnesium ferrate, $MgO.Fe_2O_3$.
239. Franklinite. Isometric; an iron, zinc and manganese ferrate and manganate, $(Fe,Zn,Mn)O.(Fe,Mn)_2O_3$.
240. Jacobsite. Isometric; a manganese and magnesium ferrate and manganate, $(Mn,Mg.)O.(Fe,Mn)_2O_3$.
241. Chromite. Isometric; iron chromate, $FeO.Cr_2O_3$.
VARIETIES :—1. *Crystals*, 2. *Massive*, 3. *Chrompicotite*, 4. *Magnochromite.*
RELATED :—*Irite, Plumboferrite.*

242. Chrysoberyl. Orthorhombic; beryllium aluminate, $BeO.Al_2O_3$.
VARIETIES :—1. *Pale Green*, 2. *Alexandrite*, 3. *Cat's Eye.*
243. Hausmannite. Tetragonal; manganese sesquioxide and protoxide, $MnO.Mn_2O_3$.
244. Minium. Pulverulent; lead plumbate, $2PbO.PbO_2$.
245. Crednerite. Monoclinic; copper manganate, $3CuO.2Mn_2O_3$.
246. Pseudobrookite. Orthorhombic; an iron titanate, $2Fe_2O_3.3TiO_2$ (?).
247. Braunite. Tetragonal; manganese silico-manganate, $3Mn_2O_3.MnSiO_3$.

IV. DEUTOXIDES. RO_2.

RUTILE GROUP. Tetragonal.

248. Cassiterite. Tetragonal; tin dioxide, SnO_2.
VARIETIES :—
1. *Crystallized*, 2. *Massive*, 3. *Wood Tin* ("Toad's-eye"), 4. *Stream Tin.*
RELATED :—*Stannite*, *Ainalite.*
249. Polianite. Tetragonal; manganese dioxide, MnO_2.
250. Rutile. Tetragonal; titanium dioxide, TiO_2.
VARIETIES :—
1. *Ordinary* :— (a) *Red Crystals*, (b) *Rutilated Quartz.* 2. *Ferriferous* :— (a) *Nigrine*, (b) *Ilmenorutile*, 3. *Chromiferous.*
RELATED :—*Iserite.*
251. Plattnerite. Tetragonal; lead dioxide, PbO_2.
252. Octahedrite. Tetragonal; titanium dioxide, TiO_2.
253. Brookite. Orthorhombic; titanium dioxide, TiO_2.
VARIETIES :—1. *Ordinary*, *Tabular*, 2. *Arkansite.*
ALTERS TO :—Rutile.
RELATED :—*Eumanite.*
254. Pyrolusite. Orthorhombic; manganese dioxide, MnO_2.

B. HYDROUS OXIDES.

255. Turgite. Fibrous; hydrous iron sesquioxide, $2Fe_2O_3.H_2O$.

DIASPORE GROUP. $R_2O_3.H_2O$.

256. Diaspore. Orthorhombic; hydrous aluminium sesquioxide, $Al_2O_3.H_2O$.
257. Göthite. Orthorhombic; hydrous iron sesquioxide, $Fe_2O_3.H_2O$.
VARIETIES :—
1. *Thin tabular*, 2. *Capillary*, 3. *Columnar or fibrous*, 4. *Scaly-fibrous*, 5. *Compact massive*, 6. *Disseminated crystals.*
258. Manganite. Orthorhombic; hydrous manganese sesquioxide, $Mn_2O_3.H_2O$.
ALTERS TO :—Pyrolusite, Hausmannite, Braunite.
259. Limonite. Massive; hydrous iron sesquioxide, $2Fe_2O_3.3H_2O$.
VARIETIES :—1. *Compact*, 2. *Ocherous*, 3. *Bog Ore*, 4. *Brown Clay-ironstone.*
ALTERS TO :—Siderite, Hematite.
260. Xanthosiderite. Acicular; hydrous iron sesquioxide, $Fe_2O_3.2H_2O$.
RELATED :—*Limnite.*
261. Bauxite. Massive; a hydrous aluminium sesquioxide, $Al_2O_3.2H_2O$.
VARIETIES :—1. *Oolitic*, 2. *Clay-like.*

BRUCITE GROUP.—$R(OH)_2$. Rhombohedral.

262. Brucite. Rhombohedral; magnesium hydrate, $MgO.H_2O$.
VARIETIES :—1. *Ordinary*, 2. *Nemalite*, 3. *Manganbrucite.*
ALTERS TO :—Hydromagnesite, Serpentine.
RELATED :—*Eisenbrucite.*
263. Pyrochroite. Rhombohedral; manganese hydrate, $Mn.O.H_2O$.
264. Gibbsite. Monoclinic; aluminium hydrate, $Al_2O_3.3H_2O$.
RELATED :—*Richmondite*, *Zirlite.*
265. Sassolite. Triclinic; boric acid, $B_2O_3.3H_2O$.
266. Hydrotalcite. Hexagonal; a hydrous aluminium and magnesium oxide, $Al_2O_3.6MgO.15H_2O$(?).
RELATED :—*Houghite.*

267. Pyroaurite. Hexagonal; a hydrous magnesium and iron oxide, $Fe_2O_3.6MgO.15H_2O(?)$.

268. Chalcophanite. Rhombohedral; a hydrated manganese and zinc protoxide and manganese dioxide, $(MnZn)O.2MnO_2.2H_2O$.

269. Psilomelane. Massive; a hydrous manganese manganate, $H_4MnO_5(?)$.

RELATED :—

1. *Wad* :—
   (a) *Bog Manganese,*
   (b) *Asbolite,*
   (c) *Lampadite.*
2. *Lithiophorite,*
3. *Varvicite.*

APPENDIX TO OXIDES.

Bernonite,
Delafossite,
Hetaerolite,
Heterogenite,
Heubachite,
Hydrated Titanic Oxide,
Hydrofranklinite,
Hydroplumbite,
Namaqualite,
Pelagite,
Rabdionite,
Transvaalite,
Winklerite.

VI. OXYGEN-SALTS.

1. Carbonates.

A. ANHYDROUS CARBONATES.

1. CALCITE GROUP. RCO_3. Rhombohedral.

270. Calcite. Rhombohedral; calcium carbonate, $CaCO_3$.

A. VARIETIES BASED ON CRYSTALLIZATION AND IMPURITIES.

I. *Ordinary* :—
   (a) *Dog-tooth Spar,*
   (b) *Nail-head Spar,*
   (c) *Iceland Spar,*
   (d) *Brunnerite,*
   (e) *Reichite,*
   (f) *Fontainebleau limestone,*
   (g) *Hislopite.*

II. *Fibrous and lamellar*:—
   (a) *Satin Spar,*
   (b) *Argentine,*
   (c) *Aphrite.*

III. *Granular massive to cryptocrystalline.*

1. *Granular limestone* :—
   (a) *Statuary marble,*
   (b) *Cipolin,*
   (c) *Giallo antico,*
   (d) *Siena,*
   (e) *Mandelato,*
   (f) *Bardiglio,*
   (g) *Turquoise-blue,*
   (h) *Verd-Antique.*
2. *Hard compact limestone (marbles)* :—
   (a) *Black,*
   (b) *Yellow,*
   (c) *Red,*
   (d) *Fetid,*
   (e) *Panno-di-Morte,*
   (f) *Marble of Languedoc,*
   (g) *Griotte,*
   (h) *Sarencolin,*
   (i) *Bird's-eye,*
   (k) *Shell-marble,*
   (l) *Madreporic marble,*
   (m) *Encrinal,*
   (n) *Lumachelle,*
   (o) *Ruin-marble,*
   (p) *Lithographic stone,*
   (q) *Breccia marble,*
   (r) *Pudding stone,*
   (s) *Hydraulic lime stone.*
3. *Soft compact limestone* :—
   (a) *Chalk,*
   (b) *Calcareous marl.*
4. *Concretionary massive*:—
   (a) *Oolite,*
   (b) *Pisolite.*
5. *Deposited by calcareous waters* :—
   (a) *Stalactites,*
   (b) *Stalagmite,*
   (c) *Mexican onyx,*
   (d) *Travertine,*
   (e) *Calc Tufa,*
   (f) *Agaric mineral,*
   (g) *Rock-meal.*

B. VARIETIES BASED UPON COMPOSITION :—

1. *Dolomitic calcite,*
2. *Baricalcite,*
3. *Strontianocalcite,*
4. *Ferrocalcite,*
5. *Manganocalcite,*
6. *Zincocalcite,*
7. *Plumbocalcite.*

ALTERS TO :—Dolomite, Calamine, Siderite, Malachite, Azurite, Gypsum, Smithsonite, Barite, Fluorite, Limonite, Göthite, Hematite, Minium, Meerschaum, Chlorite, Quartz, Chalcedony, Garnet, Feldspar, Mica, Pyrolusite, Hausmannite, Manganite, Marcasite, Galena, Sphalerite, Native copper.

RELATED :—*Thinolite, Predazzite Pencatite.*

271. Dolomite. Rhombohedral; calcium and magnesium carbonate, $CaCO_3.MgCO_3$.

STRUCTURAL VARIETIES :—

(a) *Crystallized* (*Pearl Spar*),
(b) *Columnar*,
(c) *Granular*,
(d) *Compact massive*,
(e) *Compact porcellanous*.

VARIETIES DEPENDING ON COMPOSITION :—

1. *Normal Dolomite*,
2. *Brown Spar*,
3. *Manganiferous*,
4. *Cobaltiferous*,
5. *Zinciferous*.

ALTERS TO :—Siderite, Calamine, Steatite, Limonite, Hematite, Göthite, Pyrolusite, Quartz.

271A. Ankerite. Rhombohedral; calcium, magnesium, iron and manganese carbonates, $CaCO_3(Mg,Fe,Mn)CO_3$.

272. Magnesite. Rhombohedral; magnesium carbonate, $MgCO_3$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Crystallized*,
   (b) *Lamellar*,
   (c) *Fine granular*,
   (d) *Compact*,
   (e) *Earthy*.
2. *Ferriferous* (*Breunnerite*).

272A. Mesitite. Rhombohedral; magnesium and iron carbonate, $2MgCO_3.FeCO_3$.

VARIETIES :—1. *Mesitite*, 2. *Pistomesite*.

273. Siderite. Rhombohedral; iron protocarbonate, $FeCO_3$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Crystallized*,
   (b) *Concretionary* (*Sphærosiderite*),
   (c) *Granular to compact*,
   (d) *Oolitic*,
   (e) *Earthy*.
2. *Manganiferous* (*oligonito*),
3. *Magnesian* (*sideroplesite*),
4. *Calciferous* (*siderodot*).

ALTERS TO :—Limonite, Hematite, Magnetite, Quartz.

RELATED :—*Thomäite* (*?*).

274. Rhodochrosite. Rhombohedral; manganese protocarbonate, $MnCO_3$.

VARIETIES :—

1. *Ordinary*,
2. *Ferriferous*,
3. *Calciferous* (*Manganocalcite*),
4. *Zinciferous*.

ALTERS TO :—Quartz.

275. Smithsonite. Rhombohedral; zinc carbonate, $ZnCO_3$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Crystallized*,
   (b) *Botryoidal*,
   (c) *Granular to compact*,
   (d) *Earthy*,
2. *Ferriferous*,
3. *Manganiferous*,
4. *Cupriferous* (*Herrerite*).

ALTERS TO :—Calamine, Quartz, Limonite, Göthite.

RELATED :—*Orthorhombic zinc carbonate* (*?*).

276. Sphærocobaltite. Rhombohedral; cobalt protocarbonate, $CoCO_3$.

2. ARAGONITE GROUP. RCO_3. Orthorhombic.

277. Aragonite. Orthorhombic; calcium carbonate, $CaCO_3$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Crystallized*,
   (b) *Columnar*,
   (c) *Massive*.
2. *Mossottite*,
3. *Scaly massive*,
4. *Stalactitic*,
5. *Coralloidal*,
6. *Tarnowitzite*.

ALTERS TO :—Copper, Calcite.

278. Bromlite. Orthorhombic; barium and calcium carbonate, $BaCO_3.CaCO_3$.

279. Witherite. Orthorhombic; barium carbonate, $BaCO_3$.

ALTERS TO:—Barite.

280. Strontianite. Orthorhombic; strontium carbonate, $SrCO_3$.

ALTERS TO :—Celestite.

281. Cerussite. Orthorhombic; lead carbonate, $PbCO_3$.

ALTERS TO :—Pyromorphite, Minium, Galena.

3. BARYTOCALCITE GROUP. Monoclinic.

282. Barytocalcite. Monoclinic; barium and calcium carbonate, $BaCO_3.CaCO_3$.

283. Bismutospharite. Spherical; bismuth carbonate, Bi_2CO_5.

4. PARISITE GROUP. Hexagonal.

284. Parisite. Hexagonal; a fluocarbonate of the cerium metals, $(CaF)(CeF)Ce(CO_3)_3$(?)
RELATED :—*Kischtimite.*

285. Bastnasite. Massive; a fluocarbonate of the cerium metals, $(Ce,La,Di)_2C_3O_9.(Ce,La,Di)F_3$.
RELATED :—*Weibyeïte.*

5. PHOSGENITE GROUP. Chlorocarbonate. Tetragonal.

286. Phosgenite. Tetragonal; lead chlorocarbonate, $PbCO_3.PbCl_2$.
ALTERS TO :—Lead carbonate.

B. ACID, BASIC AND HYDROUS CARBONATES.

287. Teschemacherite. Orthorhombic; acid ammonium carbonate, $(NH_4)_2CO_3.H_2CO_3$.
RELATED :—*Kalicine.*

288. Malachite. Monoclinic; basic cupric carbonate, $2CuO.CO_2.H_2O$.
RELATED :—*Lime-malachite, Mysorin.*

289. Azurite. Monoclinic; basic cupric carbonate, $3CuO.CO_2.H_2O$.
ALTERS TO :—Malachite, Native copper.
RELATED :—*Atlasite, Zinkazurite.*

290. Aurichalcite. Monoclinic (?); basic zinc and copper carbonate, $2(Zn,Cu)CO_3.3(ZnCu)(OH)_2$.

291. Hydrozincite. Massive; a basic zinc carbonate, $3ZnO.CO_2.2H_2O$(?).

292. Hydrocerussite. Hexagonal; a basic lead carbonate, $3PbO.2CO_2.H_2O$(?).

293. Dawsonite. Monoclinic (?); basic aluminium and sodium carbonate, $Na_2O.Al_2O_3.2CO_2.2H_2O$.
RELATED :—*Hovite.*

294. Thermonatrite. Orthorhombic; hydrous sodium carbonate, $Na_2CO_3+H_2O$.

295. Nesquehonite. Orthorhombic; hydrous magnesium carbonate, $MgCO_3+3H_2O$.

296. Natron. Monoclinic; hydrous sodium carbonate, $Na_2CO_3+10H_2O$.

297. Gay-lussite. Monoclinic; hydrous calcium and sodium carbonate, $CaCO_3.Na_2CO_3+5H_2O$.

298. Lanthanite. Orthorhombic; hydrous lanthanum carbonate, $La_2(CO_3)_3+9H_2O$.
RELATED :—*Hydroconite.*

299. Trona. Monoclinic; hydrous sodium carbonate and bicarbonate, $Na_2CO_3.HNaCO_3+2H_2O$.

300. Hydromagnesite. Monoclinic (?); basic magnesium carbonate, $3MgCO_3.Mg(OH)_2+3H_2O$.

301. Hydrogiobertite. Spherical; hydrous basic magnesium carbonate, $MgCO_3.Mg(OH)_2+2H_2O$.

302. Lansfordite. Triclinic; hydrous basic magnesium carbonate, $3MgCO_3.Mg(OH)_2+21H_2O$.
RELATED :—*Hydrodolomite, Hibbertite.*

303. Zaratite. Massive; hydrous basic nickel carbonate, $3NiO.CO_2.6H_2O$.

304. Remingtonite. Incrusting, a hydrous cobalt carbonate.

305. Tengerite. Pulverulent; an yttrium carbonate (?).

306. Bismutite. Incrusting; a basic bismuth carbonate, $Bi_2O_3.CO_2.H_2O$(?).
RELATED :—*Waltherite, Agnesite.*

307. Uranothallite. Orthorhombic; hydrous uranium and calcium carbonate, $2CaCO_3.U(CO_3)_2 10H_2O$.

308. Liebigite. Coatings; a hydrous uranium and calcium carbonate, $CaCO_3.(UO_2)CO_3.20H_2O$.

309. Voglite. Scales; a hydrous uranium, calcium and copper carbonate.
RELATED :—*Schröckinergite, Selbite, Randite.*

2. Silicates.

A. ANHYDROUS SILICATES.

I. DISILICATES, RSi_2O_5. POLYSILICATES, $R_2Si_3O_8$.

PETALITE GROUP.

310. Petalite. Monoclinic; lithium and aluminium disilicate, $Li_2O.Al_2O_3.8SiO_2$.
VARIETIES:—1. *Ordinary*, 2. *Castorite.*
RELATED:—*Hydrocastorite.*

311. Milarite. Hexagonal; aluminium, calcium and potassium disilicate, $H_2O.K_2O.4CaO.2Al_2O_3.24SiO_2$.

312. Eudidymite. Monoclinic; sodium and beryllium polysilicate, $H_2O.Na_2O.2BeO.6SiO_2$.

FELDSPAR GROUP.

A. MONOCLINIC SECTION.

313. Orthoclase. Monoclinic; aluminium and potassium polysilicate, $K_2O.Al_2O_3.6SiO_2$.

VARIETIES:—

1. *Adularia*,
2. *Sanidine*,
3. *Ordinary Crystals*,
4. *Cleavable*,
5. *Compact*,
6. *Leelite*,
7. *Loxoclase*,
8. *Paradoxite*,
9. *Necronite*,
10. *Lazurfeldspar*,
11. *Murchisonite*,
12. *Weissigite.*

ALTERS TO:—Steatite, Talc, Chlorite, Kaolin, Lithomarge, Mica, Laumontite, Cassiterite, Calcite.
RELATED:—*Perthite, Krablite.*

314. Hyalophane. Monoclinic; an aluminium, barium and potassium silicate, $K_2O.BaO.2Al_2O_3.8SiO_2$.

B. TRICLINIC SECTION.

315. Microcline. Triclinic; aluminium and potassium polysilicate, $K_2O.Al_2O_3.6SiO_2$.
VARIETIES:—1. *Ordinary*, 2. *Moonstone*, 3. *Amazon stone*, 4. *Chesterlite.*

315A. Anorthoclase. Triclinic; essentially a sodium and potassium polysilicate, $(NaK)Al_2Si_3O_8$.

ALBITE—ANORTHITE SERIES.

316. Albite. Triclinic; aluminium and sodium polysilicate, $Na_2O.Al_2O_3.6SiO_2$.

VARIETIES:—

1. *Crystals*,
2. *Cleavable*,
3. *Massive*,
4. *Peristerite*,
5. *Aventurine* (*Sunstone*),
6. *Moonstone*,
7. *Pericline*,
8. *Hyposclerite*,
9. *Cleavelandite*,
10. *Olafite*,
11. *Zygadite*,
12. *Tschermakite.*

NOTE.—Between the isomorphous species Albite (Ab) and Anorthite (An), are several subspecies, regarded as isomorphous mixtures of these molecules, and defined according to the ratio in which they enter.

317. Oligoclase. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_3An_1).
VARIETIES:—1. *Crystals*, 2. *Massive*, 3. *Sunstone.*

318. Andesine. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_3An_2 to Ab_1An_1).

319. Labradorite. Triclinic; aluminium, sodium and calcium polysilicate (intermediate between albite and anorthite, Ab_1An_1 to Ab_1An_3).

VARIETIES:—

1. *Cleavable*:—
   (a) *Well crystallized*,
   (b) *Massive*,
2. *Compact massive* (*Labradorite—Felsite*).

ALTERS TO:—The Zeolites, etc.
RELATED:—*Maskelynite.*

320. Anorthite. Triclinic; aluminium and calcium poly-silicate, $CaO.Al_2O_3.2SiO_2$.

VARIETIES :—

1. *Anorthite,*
2. *Christianite,*
3. *Biotine,*
4. *Crystals,*
5. *Indianite (granular),*
6. *Lepolite,*
7. *Lindsayite,*
8. *Latrobite,*
9. *Tankite (cleavable).*

RELATED :—*Barsowite, Huronite, Mikrotin, Sigterite.*

II. METASILICATES. $RSiO_3$.

1. LEUCITE GROUP. Isometric.

321. Leucite. Isometric; aluminium and potassium metasilicate, $K_2O.Al_2O_3.4SiO_2$.
ALTERS TO :—Feldspar, Nephelite, Kaolin, Analcite.

322. Pollucite. Isometric; hydrous cæsium, sodium and aluminium metasilicate, $H_2O.(Cs,Na)_2O.Al_2O_3.5SiO_2$.

2. PYROXENE GROUP.

a. ORTHORHOMBIC SECTION.

323. Enstatite. Orthorhombic; magnesium metasilicate, $MgO.SiO_2$.

VARIETIES :—

1. *Ordinary (light color,)*
2. *Chladnite,*
3. *Victorite,*
4. *Bronzite (ferriferous).*

ALTERS TO :—Talc, Serpentine.

324. Hypersthene. Orthorhombic; magnesium and iron metasilicate, $(Fe,Mg)O.SiO_2$.
VARIETIES :—1. *Lamellar*, 2. *Amblystegite*, 3. *Szaboite.*
RELATED :—*Diaclasite, Bastite, Phästine, Peckhamite.*

β. MONOCLINIC SECTION.

325. Pyroxene. Monoclinic; a normal metasilicate, mainly $CaO.(Fe,Mg)O._2SiO_2$.

I. VARIETIES CONTAINING LITTLE OR NO ALUMINIUM :—

1. *Diopside,*
2. *Chrome-diopside,*
3. *Malacolite,*
4. *Alalite,*
5. *Mussite,*
6. *Traversellite,*
7. *Canaanite,*
8. *Lavrovite,*
9. *Hedenbergite,*
10. *Salite,*
11. *Baikalite,*
12. *Protheite,*
13. *Funkite,*
14. *Lotalite,*
15. *Violan,*
16. *Anthochroite,*
17. *Asteroite,*
18. *Coccolite,*
19. *Manganhedenbergite,*
20. *Diallage,*
21. *Hudsonite,*
22. *Omphacite,*
23. *Schefferite,*
24. *Jeffersonite.*

II. ALUMINOUS VARIETIES :—

1. *Augite,*
2. *Leucaugite,*
3. *Fassaite,*
4. *Titaniferous augite,*
5. *Alkali-augite.*

ALTERS TO :—Talc, Serpentine, Epidote, Mica.

RELATED (mostly alteration products of Pyroxene) :—
Hectorite, Monradite, Picrophyll, Pitkärantite, Hydrous diallage, Pyrallolite, Strakonitzite, Uralite.

326. Acmite (Aegirite). Monoc.; iron and sodium metasilicate, $Na_2O.Fe_2O_3.4SiO_2$.
ALTERS TO :—Analcite.

327. Spodumene. Monoc.; aluminium and lithium metasilicate, $Li_2O.Al_2O_3.4SiO_2$.
VARIETIES :—1. *Ordinary white*, 2. *Hiddenite.*
ALTERS TO :—*β* Spodumene, Cymatolite, Killinite.

328. Jadeite. Monoclinic; sodium and aluminium metasilicate, $Na_2O.Al_2O_3.4SiO_2$.
VARIETIES :—1. *Ordinary*, 2. *Chloromelanite.*
(Jade is a term applied to Jadeite, Nephrite and other species.)

329. Wollastonite. Monoclinic; calcium metasilicate, $CaO.SiO_2$.
VARIETIES :—1. *Ordinary*, 2. *Edelforsite.*

330. Pectolite. Monoclinic; a sodium and calcium metasilicate, $H_2O.Na_2O.4CaO.6SiO_2$.

VARIETIES:—1. *Osmelite*, 2. *Walkerite*, 3. *Compact*, 4. *Manganpectolite.*

331. Rosenbuschite. Monoclinic; calcium and sodium metasilicate, with some zirconium, titanium and fluorine, $6CaSiO_3.2Na_2ZrO_2F_2.(TiSiO_3TiO_3)$.

332. Låvenite. Monoclinic; a manganese, iron, calcium and sodium metasilicate, with zirconium and titanium partly replacing the silicon, $(Na_4,Ca_2,Mn_2,Zr)([Si,Zr]O_3)_2$.

333. Wöhlerite. Monoclinic; a calcium and sodium metasilicate, zirconate and niobate, $12(Na_2,Ca)(Si,Zr)O_3.(Na_2Ca)Nb_2O_6$.

γ. TRICLINIC SECTION.

334. Hiortdahlite. Triclinic; a sodium and calcium metasilicate and zirconate, $(Na_2,Ca)(Si,Zr)O_3$.

335. Rhodonite. Triclinic; manganese metasilicate, $MnO.SiO_2$.

VARIETIES:—

1. *Ordinary:*— (a) *Paisbergite, Crystallized,* (b) *Granular massive.* 2. *Ferriferous,* 3. *Bustamite,* 4. *Fowlerite.*

ALTERS TO:—Marceline, Dyssnite, Stratopeite, Allagite, Photicite, Hydrorhodonite, Klipsteinite.

336. Babingtonite. Triclinic; calcium, iron and manganese metasilicate, $(Ca,Fe,Mn)SiO_3$ with $Fe_2(SiO_3)_3$.

3. AMPHIBOLE GROUP.

α. ORTHORHOMBIC SECTION.

337. Anthophyllite. Orthorhombic; magnesium and iron metasilicate, $(Mg,Fe)SiO_3$.

VARIETIES:—1. *Ordinary*, 2. *Kupfferite*, 3. *Thalackerite.*

RELATED:—*Piddingtonite.*

β. MONOCLINIC SECTION.

338. Amphibole. Monoclinic; normal magnesium and calcium metasilicate, generally with some iron, manganese, aluminium, hydrogen, sodium and potassium.

VARIETIES:—

I. CONTAINING LITTLE OR NO ALUMINIUM.

1. *Tremolite, calcium magnesium amphibole,*
2. *Nordenskiöldite,*
3. *Raphilite,*
4. *Hexagonite,*
5. *Actinolite, calcium magnesium-iron amphibole,*
6. *Nephrite,*
7. *Asbestus,*
8. *Mountain leather,*
9. *Mountain cork,*
10. *Mountain wood*
11. *Byssolite,*
12. *Smaragdite,*
13. *Uralite,*
14. *Cummingtonite, iron-magnesium amphibole,*
15. *Antholite,*
16. *Dannemorite, iron-manganese amphibole,*
17. *Asbeferrite,*
18. *Silfbergite,*
19. *Hillängsite,*
20. *Grünerite, iron amphibole,*
21. *Richterite, sodium-magnesium-manganese amphibole,*
22. *Marmairolite,*
23. *Breislakite.*

II. ALUMINOUS:—

1. *Edenite, aluminous magnesium calcium amphibole,*
2. *Koksharovite,*
3. *Pargasite,*
4. *Common Black Hornblende,*
5. *Noralite,*
6. *Gamsigradite,*
7. *Diastatite,*
8. *Syntagmatite,*
9. *Bergamaskite*
10. *Kaersutite.*

ALTERS TO:—Magnesia-mica, Chlorite, Iron-ocher, Talc, Steatite, Serpentine, Epidote, Biotite, Pinite, Chabazite, Limonite, Magnetite.

RELATED:—*Kirwanite, Loganite, Paligorskite, Phaactinite, Waldheimite.*

339. Glaucophane. Monoclinic; sodium, aluminium, iron and magnesium metasilicate, $NaAl(SiO_3)_2.(Fe,Mg)SiO_3$.

340. Riebeckite. Monoclinic; sodium, ferrous and ferric iron metasilicate, $2Na_2Fe^{III}(SiO_3)_2.FeSiO_3$.

341. Crocidolite. Fibrous; sodium, ferrous and ferric iron metasilicate, $NaFe^{III}(SiO_3)_2.FeSiO_3$.

ALTERS TO :—Quartz and called "Tiger Eye."

342. Arfvedsonite. Monoclinic; slightly basic sodium, calcium and ferrous iron metasilicate, $4Na_2O.3CaO.14FeO.(Al,Fe)_2O_3.21SiO_2$.

RELATED :—342 A. *Barkevikite, Pterolite.*

γ. TRICLINIC SECTION.

343. Ænigmatite. Triclinic; sodium and ferrous iron titano-silicates, with some aluminium and ferric iron.

VARIETIES :—1. *Ordinary crystals*, 2. *Cossyrite.*

4. BERYL GROUP. Hexagonal.

344. Beryl. Hexagonal; beryllium and aluminium metasilicates, $3BeO.Al_2O_3.6SiO_2$.

VARIETIES :—

1. *Emerald,*
2. *Ordinary* :—
   (a) *Colorless,*
   (b) *Bluish-green (aquamarine),*
   (c) *Apple-green,*
   (d) *Yellow (golden beryl),*
   (e) *Yellowish-green,*
   (f) *Sapphire-blue,*
   (g) *Sky-blue,*
   (h) *Violet,*
   (i) *Brownish yellow.*
3. *Davidsonite,*
4. *Goshenite.*

RELATED :—*Rosterite, Pseudosmaragd.*

ALTERS TO :—Kaolin, Mica, Limonite, Quartz.

5. EUDIALYTE GROUP.

345. Eudialyte. Rhombohedral; sodium, potassium, calcium, iron, manganese metasilicate, with some cerium hydrate and zirconium oxychloride.

VARIETIES :—1. *Ordinary*, 2. *Eucolite.*

346. Catapleiite. Hexagonal (?); a sodium and calcium metasilicate and zirconate, $H_2(Na_2,Ca)(Zr(OH)_2)(SiO_3)_3$.

VARIETIES :—1. *Ordinary*, 2. *Natron-catapleiite.*

ALTERS TO :—Zircon.

6. MELANOCERITE GROUP.

347. Cappelenite. Hexagonal; an yttrium and barium boro-silicate, with sodium, potassium, calcium, and various rare earths.

348. Melanocerite. Rhombohedral; cerium, yttrium and calcium fluo-silicate, with some boron, tantalum, etc.

349. Caryocerite. Rhombohedral; near melanocerite, but containing more thorium.

RELATED :—*Steenstrupine.*

350. Tritomite. Rhombohedral; thorium, cerium, yttrium and calcium fluo-silicate, with some boron.

RELATED :—*Erdmannite.*

II. INTERMEDIATE SILICATES.

1. LEUCOPHANITE GROUP.

351. Leucophanite. Orthorhombic; sodium, beryllium and calcium fluo-silicate, $Na(BeF)Ca(SiO_3)_2$.

352. Meliphanite. Tetragonal; beryllium, calcium and sodium fluo-silicate, $NaCa_2Be_2FSi_3O_{10}$.

2. IOLITE GROUP.

353. Iolite. Orthorhombic; a magnesium, iron and aluminium silicate, $H_2O.4(Mg,FeO).4Al_2O_3.10SiO_2$.

VARIETIES :—1. *Ordinary*, 2. *Cerasite.*

ALTERS TO :—Fahlunite, Auralite, Chlorophyllite, Aspasiolite.

3. BARYSILITE GROUP.

354. Barysilite. Hexagonal; lead silicate, $3PbO.2SiO_2$.
355. Ganomalite. Tetragonal; lead, manganese and calcium silicate, $3PbO.2(Ca,Mn)O.3SiO_2$.
356. Hyalotekite. Massive; a lead, barium and calcium boro-silicate.

III. ORTHOSILICATES. R_2SiO_4.

1. NEPHELITE GROUP. Hexagonal.

357. Nephelite. Hexagonal; a sodium, potassium and aluminium orthosilicate, $3Na_2O.K_2O.4Al_2O_3.9SiO_2$.
VARIETIES :—1. *Glassy nephelite*, 2. *Elæolite*.
ALTERS TO :—Thomsonite, Analcite, Liebenerite, Gieseckite, Dysyntribite.
358. Eucryptite. Hex.; lithium and aluminium orthosilicate, $Li_2O.Al_2O_3.2SiO_2$.
359. Kaliophilite. Hexagonal; potassium and aluminium orthosilicate, $K_2O.Al_2O_3.2SiO_2$.
360. Cancrinite. Hexagonal; a calcium, sodium and aluminium orthosilicate with sodium carbonate, $3H_2O.4Na_2O.CaO.4Al_2O_3.9SiO_2.2CO_2$.
RELATED :—*Kalk-cancrinite*.
361. Microsommite. Hexagonal; a sodium, potassium, calcium and aluminium sulpho-chlor orthosilicate (?).
RELATED :—*Davyne, Cavolinite*.

2. SODALITE GROUP. Isometric.

362. Sodalite. Isom.; sodium and aluminium chloro-silicate, $Na_4(AlCl)Al_2Si_3O_{12}$.
ALTERS TO :—Kaolin, Thomsonite, Hydronephelite, Muscovite, Natrolite, Diaspore.
363. Haüynite. Isometric; sodium, calcium and aluminium orthosilicate with some sodium sulphate, $Na_2Ca(NaSO_4.Al)Al_2Si_3O_{12}$.
364. Noselite. Isometric; sodium and aluminium silicate and sodium sulphate, $Na_4(NaSO_4.Al)Al_2Si_3O_{12}$.
RELATED :—*Ittnerite*.
365. Lazurite. Isometric; sodium and aluminium orthosilicite and sodium sulphide, $Na_4(NaS_3.Al)Al_2Si_3O_{12}$.

3. HELVITE GROUP.

366. Helvite. Isometric; beryllium, manganese, and iron sulpho-silicate, $(Be,MnFe)_7Si_3O_{12}S$.
RELATED :—*Achtaragdite*.
367. Danalite. Isometric; beryllium, iron, zinc and manganese sulpho-silicate, $(Fe,Zn,Mn)_2((ZnFe)_2S)Be_3Si_3O_{12}$.
368. Eulytite. Isometric; bismuth orthosilicate, $2Bi_2O_3.3SiO_2$.
369. Zunyite. Isometric; basic aluminium orthosilicate, $(Al(OH,F,Cl)_2)_6Al_2Si_3O_{12}$.

4. GARNET GROUP.

370. Garnet. Isometric; an orthosilicate containing calcium, magnesium, ferrous iron or manganese and aluminium, ferric iron or chromium.

VARIETIES :—

I. ALUMINIUM GARNET.

A. *Grossularite, Calcium Aluminium Garnet, (Essonite Cinnamon Stone, Wiluite)*.
B. *Pyrope, Magnesium Aluminium Garnet, (Precious)*.
C. *Almandite, Iron-aluminium Garnet, (Precious, common)*.
D. *Spessartite, Manganese Aluminium Garnet*.

II. IRON GARNET.

E. *Andradite*.
1. *Calcium-iron Garnet*,
(a) *Topazolite, Demantoid*,
(b) *Colophonite*,
(c) *Melanite*,
(d) *Dark green, Jelletite, Calderite*,
2. *Manganesian Calcium-iron Garnet*,
(a) *Rothoffite*,
(b) *Allochroite*,
(c) *Polyadelphite*,
(d) *Aplome*,
3. *Titaniferous*,
4. *Yttriferous Calcium-iron Garnet, (Yttergarnet)*.

III. Chromium Garnet.

F. *Uvarovite, Calcium-chromium Garnet.*

Alters to :—Limonite, Magnetite, Hematite, Quartz, Epidote, Amphibole, Orthoclase, Steatite, Serpentine, Chlorite, Scapolite, Mica, Oligoclase.

Related :—*Trautwinite.*

371. Schorlomite. Isometric; calcium, iron and titanium silico-titanate, $3CaO.(Fe,Ti)_2O_3.3(SiTi)O_2$.

Related :—*Ivaarite.*

372. Partschinite. Monoclinic; manganese, iron and aluminium silicate, $(Mn,Fe)_3Al_2Si_3O_{12}$.

373. Agricolite. Monoclinic; bismuth orthosilicate, $Bi_4Si_3O_{12}$.

5. CHRYSOLITE GROUP.

374. Monticellite. Orthorh.; magnesium and calcium orthosilicate, $CaO.MgO.SiO_2$.

Varieties :—1. *Gray Crystals*, 2. *Batrachite.*

Alters to :—Serpentine.

375. Forsterite. Orthorhombic; magnesium orthosilicate, $2MgO.SiO_2$.

Varieties :—1. *Forsterite*, 2. *Boltonite.*

376. Chrysolite. Orthorh.; magnesium and iron orthosilicate, $2(MgFe)O.SiO_2$.

Varieties :—

1. *Precious,*
2. *Olivine (Ordinary),*
3. *Hyalosiderite,*
4. *Glinkite.*

Alters to :—Serpentine, Anthophyllite, Amphibole.

Related :—*Villarsite, Matricite, Ferrite, Hortonolite, Neochrysolite, Titanolivine.*

377. Fayalite. Orthorhombic; ferrous iron orthosilicate, $2FeO.SiO_2$.

378. Knebelite. Orthorhombic; an iron, manganese and magnesium orthosilicate, $2(Fe,Mn,Mg)O.SiO_2$.

Varieties :—1. *Ordinary*, 2. *Igelströmite.*

379. Tephroite. Orthorhombic; manganese orthosilicate, $2MnO.SiO_2$.

Related :—*Hydrotephroite, Epigenite.*

379A. Roepperite. Orthorhombic; iron, manganese, zinc and magnesium orthosilicate, $(Fe,Mn,Zn,Mg)_2SiO_4$.

6. PHENACITE GROUP.

380. Trimerite. Triclinic; manganese, calcium and beryllium orthosilicate, $(Mn,Ca)_2SiO_4.Be_2SiO_4$.

381. Willemite. Rhombohedral; zinc orthosilicate, $2ZnO.SiO_2$.

Varieties :—1. *Common*, 2. *Troostite*, 3. *Tephrowillemite.*

382. Phenacite. Rhombohedral; beryllium orthosilicate, $2BeO.SiO_2$.

383. Dioptase. Rhombohedral; basic copper orthosilicate, $H_2O.CuO.SiO_2$.

384. Friedelite. Rhombohedral; basic manganese chloride and orthosilicate, $H_7(MnCl)Mn_4Si_4O_{16}$.

385. Pyrosmalite. Rhombohedral; basic iron and manganese chloride and orthosilicate, $H_7((Fe,Mn)Cl)(Fe,Mn)_4Si_4O_{16}$.

7. SCAPOLITE GROUP.

386. Meionite. Tetragonal; calcium and aluminium silicate, $4CaO.3Al_2O_3.6SiO_2$.

Varieties :—1. *Ordinary Crystals*, 2. *Ersbyite.*

387. Wernerite. Tetragonal; aluminium, calcium and sodium chloro-silicate.

Varieties :—

1. *Ordinary Crystals,*
2. *Nuttalite,*
3. *Passauite,*
4. *Ontariolite,*
5. *Glaucolite,*
6. *Pink massive.*

Alters to :—Pinite, Epidote, Steatite, Magnesia mica, Kaolin-like compound, Silica.

388. Mizzonite. Tetragonal; an aluminium, sodium and calcium chloro-silicate.

Varieties :—

1. *Ordinary,*
2. *Dipyre,*
3. *Couseranite,*
4. *Prehnitoid,*
5. *Riponite.*

389. Marialite. Tet.; sodium and aluminium chloro-silicate, $Na_4Al_3Si_9O_{24}Cl$.

ALTERED SCAPOLITES :—

Atheriastite,	*Wilsonite*,	*Pseudo-scapolite*,
Stroganovite,	*Terenite*,	*Paralogite*.
Algerite,	*Gabronite*,	

390. Sarcolite. Tetragonal; aluminium, calcium and sodium orthosilicate, $3(Ca\text{-}Na_2)O.Al_2O_3.3SiO_2$.

8. MELILITE GROUP.

391. Melilite. Tetragonal; a sodium, calcium, magnesium, aluminium and iron silicate, $Na_2(Ca,Mg)_{11}(Al,Fe)_4Si_9O_{36}(?)$.

RELATED :—*Akermanite.*

392. Gehlenite. Tet.; calcium and aluminium orthosilicate, $3CaO.Al_2O_3.2SiO_2$.

ALTERS TO :—Steatite, Fassaite, Grossularite.

RELATED :—*Cacoclasite.*

9. VESUVIANITE GROUP.

393. Vesuvianite. Tetragonal; a basic calcium-aluminium silicate, $H(OH)_3Ca_{12}\cdot(Al,Fe)_6(SiO_4)_{10}(?)$.

VARIETIES :—1. *Ordinary*, 2. *Cyprine.*

ALTERS TO :—Steatite, Mica, Clinochlore, Diopside, Garnet.

10. ZIRCON GROUP.

394. Zircon. Tetragonal; zirconium silicate, $ZrO.SiO_2$.

VARIETIES :—

1. *Ordinary*,	3. *Hyacinth (gem)*,	5. *Beccarite.*
2. *Azorite*,	4. *Jargon*,	

ALTERED ZIRCON :—

Malacon,	*Œrstedite*,	*Cyrtolite*,
Tachyaphaltite,	*Auerbachite*,	*Alvite.*

395. Thorite. Tetragonal; anhydrous thorium silicate, $ThO_2.SiO_2$.

VARIETIES :—1. *Thorite*, 2. *Orangite*, 3. *Uranothorite.*

RELATED :—*Calciothorite*, *Eucrasite*, *Freyalite*, *Auerlite.*

11. DANBURITE—TOPAZ GROUP.

396. Danburite. Orthorhombic; calcium and boron silicate, $CaO.B_2O_3.2SiO_2$.

397. Topaz. Orthorhombic; an aluminium fluo-silicate, $(Al(O,F_2))AlSiO_4$.

VARIETIES :—1. *Crystals*, 2. *Massive*, 3. *Physalite*, 4. *Pycnite.*

ALTERS TO :—Steatite, Damourite, Kaolin.

398. Andalusite. Orthorhombic; aluminium silicate, $Al_2O_3.SiO_2$.

VARIETIES :—1. *Ordinary Crystals*, 2. *Chiastolite.*

ALTERS TO :—Kaolin, Muscovite, Pinite, Cyanite.

399. Sillimanite. Orthorhombic; aluminium silicate, $Al_2O_3.SiO_2$.

VARIETIES :—1. *Sillimanite*, 2. *Fibrolite*, 3. *Bamlite*, 4. *Xenolite*, 5. *Wörthite.*

RELATED :—*Glancespar*, *Westanite.*

400. Cyanite. Triclinic; aluminium silicate, $Al_2O_3.SiO_2$.

ALTERS TO :—Talc, Steatite.

12. DATOLITE GROUP.

401. Datolite. Monoclinic; a basic calcium and boron orthosilicate, $H_2O.2CaO.B_2O_3.2SiO_2$.

VARIETIES :—1. *Glassy Crystals*, 2. *Compact massive*, 3. *Botryoidal.*

ALTERS TO :—Chalcedony (called Haytorite).

402. Homilite. Monoclinic; calcium and iron boro-silicate, $2CaO.FeO.B_2O_3.2SiO_2$.

RELATED :—*Erdmannite.*

403. Euclase. Monoclinic; basic beryllium and aluminium orthosilicate, $H_2O.2BeO.Al_2O_3.2SiO_2$.

404. Gadolinite. Monoclinic; a beryllium, iron and yttrium orthosilicate, $2BeO.FeO.2Y_2O_3.2SiO_2$.

ALTERS TO :—Ocher-like mineral.

405. Yttrialite. Massive; chiefly a silicate of thorium and the yttrium metals.

RELATED :—*Yttrium silicate.*

13. EPIDOTE GROUP.

406. Zoisite. Orthorhombic; basic calcium and aluminium silicate, $4CaO.3Al_2O_3.6SiO_2.H_2O$.

VARIETIES:—1. *Ordinary*, 2. *Rose-red* (*Thulite*), 3. *Compact, massive.*

RELATED:—*Saussurite.*

407. Epidote. Monoclinic; basic calcium, aluminium and iron silicate, $H_2O.4CaO.3(Al,Fe)_2O_3.6SiO_2$.

VARIETIES:—

1. *Ordinary,*
   (a) *Crystals,*
   (b) *Fibrous,*
   (c) *Granular massive,*
   (d) *Scorza* (*sand*),
2. *Bucklandite,*
3. *Withamite,*
4. *Beustite,*
5. *Escherite.*

RELATED:—*Picroepidote.*

408. Piedmontite. Monoclinic; basic calcium, aluminium, manganese and iron silicate, $H_2O.4CaO.3(Al,Mn,Fe)_2O_3.6SiO_2$.

409. Allanite. Monoclinic; basic calcium, iron, aluminium, cerium and yttrium metals, orthosilicate, $H_2O.4(Ca,Fe)O._3(Al,Fe,Ce,Di,La,Y)_2O_3.6SiO_2$.

VARIETIES:—

1. *Ordinary,*
2. *Bucklandite,*
3. *Uralorthite,*
4. *Bagrationite,*
5. *Orthite,*
6. *Xanthorthite,*
7. *Pyrorthite.*

RELATED:—*Wasite, Muromontite, Bodenite.*

14. AXINITE GROUP.

410. Axinite. Triclinic; an aluminium and calcium boro-silicate, some iron and manganese, $H_2Ca_4(BO)Al_3(SiO_4)_5(?)$.

ALTERS TO:—Chlorite.

ORTHOSILICATES NOT INCLUDED IN FOREGOING GROUPS.

411. Prehnite. Orthorh.; acid calcium and aluminium orthosilicate, $H_2Ca_2Al_2Si_3O_{12}$.

ALTERS TO:—Green earth, Feldspar.

RELATED:—*Uigite, Prehnitoid.*

412. Harstigite. Orthorhombic; an acid manganese and calcium orthosilicate, $H_7(Ca,Mn)_{12}Al_3Si_{10}O_{40}(?)$.

413. Cuspidine. Monoclinic; contains silica, calcium, fluorine and carbon dioxide; formula doubtful.

IV. SUBSILICATES.

HUMITE GROUP.

414. Humite. Orthorhombic; magnesium fluo-silicate, $Mg_{13}(MgF)_4(MgOH)_2Si_8O_{32}$.

415. Chondrodite. Monoclinic; magnesium fluo-silicate.

ALTERS TO:—Serpentine.

416. Clinohumite. Monoclinic; magnesium fluo-silicate.

417. Ilvaite. Orthorhombic; calcium and ferrous and ferric iron silicate, $H_2O.CaO.4FeO.Fe_2O_3.4SiO_2$.

418. Ardennite. Orthorhombic; an aluminium and manganese vanadio-silicate, $5H_2O.8MnO.4Al_2O_3.V_2O_5.8SiO_2(?)$.

419. Langbanite. Hexagonal; manganese silicate and ferrous iron antimonate, $37Mn_3SiO_7.10Fe_3Sb_2O_8(?)$.

KENTROLITE GROUP.

420. Kentrolite. Orthorh.; lead and manganese silicate, $2PbO.Mn_2O_3.2SiO_2(?)$.

421. Melanotekite. Massive; lead and ferric iron silicate, $2PbO.Fe_2O_3.2SiO_2$.

422. Bertrandite. Orthorhombic; basic beryllium orthosilicate, $H_2O.4BeO.2SiO_2$.

423. Calamine. Orthorhombic; basic zinc silicate, $H_2O.2ZnO.SiO_2$.

VARIETIES:—

1. *Ordinary:*—
   (a) *Crystals,*
   (b) *Stalactitic,*
   (c) *Massive,*
2. *Carbonated,*
3. *Argillaceous*
4. *Wagite.*

RELATED:—*Moresnetite, Vanuxemite*

424. Carpholite. Monoclinic; basic manganese, aluminium metasilicate(?), $2H_2O.MnO.Al_2O_3.2SiO_2$.

425. Cerite. Orthorhombic; calcium, iron and cerium silicate, $3H_2O.2(Ca,Fe)O.3Ce_2O_3.6SiO_2$(?).

426. Tourmaline. Rhombohedral; boron, aluminium and either magnesium, iron or alkali silicate.

VARIETIES :—

I. *Based on color :—*
- (a) *Rubellite,*
- (b) *Indicolite,*
- (c) *Brazilian Sapphire,*
- (d) *Brazilian Emerald,*
- (e) *Peridot of Ceylon,*
- (f) *Achroite,*
- (g) *Aphrizite.*
- (h) *Colmmnar and black.*

II. *Based on composition :—*
- (a) *Alkali Tourmaline,*
- (b) *Iron Tourmaline,*
- (c) *Magnesium Tourmaline,*
- (d) *Chromium Tourmaline.*

ALTERS TO :—Mica, Chlorite, Cookeite, Steatite.

RELATED :—*Zeuxite.*

427. Dumortierite. Orthorhombic; a basic aluminium silicate, $4Al_2O_3.3SiO_2$(?).

428. Staurolite. Orthorhombic; a basic iron, magnesium and aluminium silicate, $2H_2O.6(Fe,Mg)O.12Al_2O_3.11SiO_2$(?)

VARIETIES :—1. *Ordinary,* 2. *Nordmarkite,* 3. *Xantholite.*

ALTERS TO :—Steatite.

429. Kornerupine. Orthorhombic; magnesium and aluminium silicate, $MgO.Al_2O_3.SiO_2$.

RELATED :—Kryptotil.

430. Sapphirine. Monoc.; magnesium and aluminium silicate, $5MgO.6Al_2O_3.2SiO_2$.

APPENDIX TO ANHYDROUS SILICATES.

Barylite, *Monzonite,* *Ramosite,*
Hypochlorite, *Neociano,* *Sphenoclase.*
Bismutoferrite,

B. HYDROUS SILICATES.

I. ZEOLITE DIVISION.

1. INTRODUCTORY SUBDIVISION.

431. Inesite. Tric.; hydrous manganese and calcium silicate, $2(Mn,Ca)SiO_3+H_2O$.

432. Ganophyllite. Monoclinic; hydrous manganese and aluminium silicate, $6H_2O7MnO.Al_2O_3.8SiO_2$.

433. Okenite. Orthorhombic (?); hydrous calcium silicate, $2H_2O.CaO.2SiO_2$.

434. Gyrolite. In concretions; hydrous calcium silicate, $3H_2O.2CaO.3SiO_2$.

435. Apophyllite. Tetragonal; hydrous potassium and calcium silicate, $K_2O.8CaO.16SiO_2.16H_2O$.

VARIETIES :—

1. *Ordinary,*
2. *Oxhaverite,*
3. *Albine,*
4. *Xylochlore,*
5. *Tesselite,*
6. *Leucocyclite.*

OTHER HYDROUS CALCIUM SILICATES, NOT PERFECTLY DEFINED :—

Centrallassite, *Tobermorite,* *Plombierite,*
Xonotlite, *Chalcomorphite,* *Louisite.*

2. ZEOLITES.

MORDENITE GROUP.

436. Ptilolite. Masses of minute needles; hydrous calcium, sodium, potassium and aluminium silicate, $(Ca,K_2,Na_2)Al_2Si_{10}O_{24}+5H_2O$.

437 Mordenite. Monoclinic; hydrous calcium, sodium, potassium and aluminium silicate, $3(Ca,Na_2,K_2)Al_2Si_{10}O_{24}+20H_2O$.

RELATED :—*Steeleite, Pseudonatrolite.*

HEULANDITE GROUP. Monoclinic.

438. Heulandite. Monoclinic; hydrous calcium and aluminium silicate, $5H_2O.CaO.Al_2O_3.6SiO_2$.

RELATED :—*Oryzite.*

439. Brewsterite. Monoclinic; hydrous barium, strontium, calcium and aluminium silicate, $(Sr,Ba,Ca)O.Al_2O_3.6SiO_2.5H_2O$.

440. Epistilbite. Monoclinic; hydrous calcium and aluminium silicate, $CaO.Al_2O_3.6SiO_2.5H_2O$.

PHILLIPSITE GROUP. Monoclinic.

441. Phillipsite. Monoclinic; hydrous potassium, calcium and aluminium silicate, generally $(K_2,Ca)Al_2Si_4O_{12} + 4\frac{1}{2}H_2O$.

RELATED :—*Spangite.*

442. Harmotome. Monoclinic; hydrous potassium, barium and aluminium silicate, $(K_2,Ba)O.Al_2O_3.5SiO_2.5H_2O$.

443. Stilbite. Monoclinic ; hydrous sodium, calcium and aluminium silicate, generally $(Na_2,Ca)O.Al_2O_3.6SiO_2.6H_2O$.

VARIETIES :—1. *Crystallized*, 2. *Radiated*, 3. *Spherical* (*Sphærostilbite*).

ALTERS TO :—Quartz.

RELATED :—*Foresite.*

444. Gismondite. Monoclinic; hydrous calcium and aluminium silicate, with some potash, corresponds nearly to $CaAl_2Si_4O_{12} + 4H_2O$.

445. Laumontite. Monoclinic; hydrous calcium and aluminium silicate, $4H_2O.CaO.Al_2O_3.4SiO_2$.

VARIETIES :—

1. *Ordinary*,
2. *Leonhardite*,
3. *Caporcianite*,
4. *Schneiderite*,
5. *Ædelforsite.*

ALTERS TO :—Orthoclase.

446. Laubanite. Fibrous and radiating; hydrous calcium and aluminium silicate, $2CaO.Al_2O_3.5SiO_2 + 6H_2O$.

CHABAZITE GROUP. Rhombohedral.

447. Chabazite. Rhombohedral; hydrous calcium, sodium and aluminium silicate, usually corresponds to $(Ca,Na_2)Al_2Si_4O_{12} + 6H_2O$.

VARIETIES :—

1. *Ordinary*,
   (a) *Acadialite*,
   (b) *Haydenite*,
2. *Phacolite* (*Herschellite or Seebachite*).

RELATED :—*Doranite.*

448. Gmelinite. Rhombohedral; hydrous sodium, calcium and aluminium silicate, $(Na_2,Ca)Al_2Si_4O_{12}+6H_2O$.

RELATED :—*Groddeckite.*

449. Levynite. Rhombohedral; hydrous calcium and aluminium silicate, $CaAl_2Si_3O_{10}+5H_2O$.

RELATED :—*Mesolin.*

450. Analcite. Isometric; hydrous sodium and aluminium silicate, $Na_2O.Al_2O_3.4SiO_2.2H_2O$.

VARIETIES :—1. *Ordinary*, 2. *Euthallite*, 3. *Eudnophite.*

ALTERS TO :—Prehnite, Lithomarge.

Cluthalite is possibly an alteration.

451. Faujasite. Isometric; hydrous sodium, calcium and aluminium silicate, $Na_2O.CaO.2Al_2O_3.10SiO.20H_2O(?)$.

452. Edingtonite. Tetragonal; hydrous barium and aluminium silicate, $BaO.Al_2O_3.3SiO_2.3H_2O(?)$.

RELATED :—*Glottalite.*

NATROLITE GROUP.

453. Natrolite. Orthorhombic; hydrous sodium and aluminium silicate, $Na_2O.Al_2O_3.3SiO_2+2H_2O$.

VARIETIES :—

1. *Ordinary* :—
   (a) *Groups of slender prisms*,
   (b) *Fibrous radiated masses*,
   (c) *Solid amygdules*,
   (d) *Compact massive*,
2. *Fargite*,
3. *Radiolite*,
4. *Bergmannite* (*Spreustein*).

RELATED :—*Ellagite.*

454. Scolecite. Monoclinic; hydrous calcium and aluminium silicate, $CaO.Al_2O_3.3SiO_2.3H_2O$.

455. Mesolite. Monoclinic and triclinic; a hydrous calcium, sodium and aluminium silicate.

VARIETIES :—

1. *Ordinary,*
   (a) *Acicular and capillary,*
   (b) *Fibrous stalactites,*
   (c) *White amorphous,*
2. *Harringtonite,*
3. *Galactite.*

THOMSONITE GROUP.

456. Thomsonite. Orthorhombic; hydrous sodium, calcium and aluminium silicate, $(Na_2,Ca)O.Al_2O_3.2SiO_2.\frac{5}{2}H_2O$.

VARIETIES :—

1. *Ordinary,*
   (a) *Rectangular prisms,*
   (b) *Slender prisms,*
   (c) *Radiated fibrous,*
   (d) *Spherical concretions,*
   (e) *Ozarkite,*
2. *Mesole (Faroelite),*
3. *Scoulerite,*
4. *Chalilite.*

RELATED :—*Picrothomsonite.*

457. Hydronephelite. Hexagonal(?); hydrous sodium and aluminium silicate, usually $2Na_2O.3Al_2O_3.6SiO_2.7H_2O$.

VARIETIES :—1. *Ordinary,* 2. *Ranite.*

APPENDIX TO ZEOLITES.

Chlorastrolite, *Zonochlorite,* *Dolianite,* *Episphärite,* *Sasbachite,* *Sloanite,* *Unknown Zeolite.*

II. MICA DIVISION.

1. MICA GROUP. Monoclinic.

458. Muscovite. Monoclinic; hydrous potassium and aluminium orthosilicate. $2H_2O.K_2O.3Al_2O_3.6SiO_2$.

VARIETIES :—

1. *Ordinary Muscovite,*
2. *Damourite,*
   (a) *Sterlingite,*
   (b) *Margarodite,*
   (c) *Gilbertite,*
   (d) *Talcite,*
   (e) *Adamsite,*
   (f) *Ivigtite,*
   (g) *Sericite,*
   (h) *Metasericite,*
   (i) *Lepidomorphite,*
   (j) *Pycnophyllite,*
   (k) *Leucophyllite,*
3. *Oncosine,*
   (a) *Oncophyllite,*
   (b) *Didymite,*
4. *Fuchsite,*
5. *Avalite,*
6. *Oellacherite.*

ALTERS TO :—Steatite, Serpentine.

Pinite is probably an impure massive variety and includes a large number of alteration products as follows :—

Gigantolite, *Gieseckite,* *Lythrodes,* *Liebenerite,* *Dysyntribite,* *Parophite,* *Rosite,* *Polyargite,* *Pinitoid,* *Hygrophilite,* *Wilsonite,* *Killinite,* *Agalmatolite,* *Oosite,* *Cataspilite.*

459. Paragonite. Massive; a hydrous sodium and aluminium silicate, $2H_2O.Na_2O.3Al_2O_3.6SiO_2$.

VARIETIES :—1. *Ordinary,* 2. *Cossaite.*

RELATED :—*Euphyllite.*

460. Lepidolite. Crystalline; a potassium, lithium and aluminium basic fluo-silicate, $KLi[Al(OH,F)_2]Al(SiO_3)_3$.

RELATED :—*Cookeite.*

461. Zinnwaldite. Monoclinic; a basic potassium, lithium, iron and aluminium fluo-silicate, $(K,Li)_3FeAl_3Si_3O_{16}(OH,F)_2$.

VARIETIES:—1. *Ordinary,* 2. *Rabenglimmer,* 3. *Cryophyllite,* 4. *Polylithionite.*

RELATED:—*Protolithionite.*

462. Biotite. Monoclinic; potassium, magnesium, aluminium, ferrous and ferric iron orthosilicate, $(H,K)_2(Mg,\overset{II}{Fe})_2(\overset{III}{AlFe})_2(SiO_4)_3$.

VARIETIES :—

Divided into—I. Meroxene Ax.pl. $\parallel b$.
II. Anomite Ax.pl. $\perp b$.
1. *Barytbiotite*,
2. *Chromglimmer*.
3. *Siderophyllite*,
4. *Haughtonite*,
5. *Manganophyllite*.

RELATED:—*Rubellan, Eukamptite, Voigtite, Rastolyte, Hydrobiotite, Pseudobiotite, Bastonite.*

462A. Phlogopite. Monoclinic; potassium, magnesium and aluminium fluosilicate, $(H,K,(MgF))_3Mg_3Al(SiO_4)_3$.

RELATED:—*Aspidolite.*

462B. Lepidomelane. Hexagonal (?); potassium, aluminium, ferrous and ferric iron silicate, $(H,K)_2Fe_3(FeAl)_4(SiO_4)_5$.

RELATED :—*Pterolite, Alurgite, Helvetan.*

463. Roscoelite. Minute scales; a basic potassium, magnesium, iron, aluminium and vanadium silicate, $H_8K(Mg,Fe)(Al,V)_4(SiO_3)_{12}(?)$.

2. CLINTONITE GROUP. Monoclinic.

464. Margarite. Monoc.; basic aluminium and calcium silicate, $H_2CaAl_4Si_2O_{12}$.

ALTERS TO :—Dudleyite.

465. Seybertite. Monoclinic; basic magnesium, calcium and aluminium silicate, $3H_2O.10(Mg,Ca)O.5Al_2O_3.4SiO_2$.

VARIETIES :—1. *Clintonite*, 2. *Brandisite.*

465A. Xanthophyllite. Monoclinic; a basic magnesium, calcium and aluminium silicate, $H_8(Mg,Ca)_{14}Al_{10}Si_5O_{52}(?)$.

VARIETIES :—1. *Ordinary*, 2. *Waluewite.*

466. Chloritoid. Monoclinic or triclinic; a basic iron, magnesium and aluminium silicate, $H_2(Fe,Mg)Al_2SiO_7$.

VARIETIES :—1. *Ordinary*, 2. *Sismondine*, 3. *Masonite*, 4. *Salmite.*

467. Ottrelite. Monoclinic or triclinic; a basic iron, manganese and aluminium silicate, $H_2(Fe,Mn)Al_2Si_2O_9(?)$.

VARIETIES :—1. *Ordinary*, 2. *Venasquite*, 3. *Phyllite.*

3. CHLORITE GROUP. Monoclinic.

468. Clinochlore. Monoclinic; basic magnesium and aluminium silicate, $4H_2O.5MgO.Al_2O_3.3SiO_2$.

VARIETIES :—

1 *Ordinary*,
(a) *Crystals*,
(b) *Foliated*,
(c) *Massive*,
2. *Leuchtenbergite*,
3. *Kotschubeite*,
4. *Manganiferous.*

468A. Penninite. Monoclinic, rhomboh. symmetry; basic magnesium, aluminium and iron silicate, $H_8(Mg,Fe)_5Al_2Si_3O_{18}$.

VARIETIES :—

1. *Penninite*,
2. *Hydrotalc*,
3. *Kämmererite*,
4. *Rhodochrome*,
5. *Loganite*,
6. *Pseudophite.*

RELATED :—*Tabergite.*

469. Prochlorite. Monoclinic; basic magnesium, iron and aluminium silicate.

RELATED :—*Grochauite.*

470. Corundophilite. Monoclinic; a basic magnesium and aluminium silicate, $H_{20}Mg_{11}Al_8Si_6O_{45}$.

RELATED :—*Amesite.*

471. Daphnite. Monoclinic; a basic iron and aluminium sil., $H_{56}Fe_{27}Al_{20}Si_{18}O_{121}$.

RELATED :—*Metachlorite, Klementite.*

472. Cronstedtite. Rhombohedral: a basic ferrous and ferric iron silicate, $4FeO.2Fe_2O_3.3SiO_2.4H_2O(?)$.

473. Thuringite. Massive; a basic aluminium, ferrous and ferric iron silicate, $8FeO.4(Al,Fe)_2O_3.6SiO_2.9H_2O$.

RELATED :—*Chamosite, Berthierine.*

474. Stilpnomelane. Crystalline; a basic magnesium, aluminium, ferrous and ferric iron silicate, $2(Fe,Mg)O.(Fe,Al)_2O_3.5SiO_2.3H_2O(?)$.

VARIETIES :—1. *Ordinary*, 2. *Chalcodite.*

475. Strigovite. Minute prisms; a basic aluminium, ferrous and ferric iron silicate, $2FeO.(Fe,Al)_2O_3.2SiO_2.2H_2O$.

476. Diabantite. Monoclinic(?); a basic ferrous iron, magnesium and aluminium silicate, $12(Fe,Mg)O.2Al_2O_3.9SiO_3.9H_2O$.

477. Aphrosiderite. Massive; a basic aluminium, ferrous and ferric iron silicate, $H_{10}Fe_6(Fe,Al)_4Si_4O_{25}(?)$.

478. Delessite. Massive; a basic magnesium, aluminium, ferrous and ferric iron silicate, $H_{10}(Mg,Fe)_4(Al,Fe)_4Si_4O_{23}(?)$.

RELATED :—*Subdelessite.*

479. Rumpfite. Massive; a basic aluminium and magnesium silicate, $7MgO.8Al_2O_3.10SiO_2.14H_2O(?)$.

OTHER CHLORITIC MINERALS, IMPERFECTLY DEFINED.

Talc-chlorite of Traversella, *Epichlorite*, *Euralite*, *Epiphanite*, *Chlorophæite*, *Hullite*, *Melanolite*, *Ekmannite*, *Berlauite*, *Steatargillite*, *Pattersonite*, *Mineral from Webster, N.C.* *Mineral from Altenburg*, *Baltimorite*, *Dumasite*, *Prasilite*, *Grastite*, *Viridite.*

APPENDIX TO MICAS—VERMICULITES.

480. Jefferisite. Crystalline plates; a hydrous magnesium, aluminium, ferrous and ferric iron silicate, $H_{70}(Mg,Fe)_{53}(Al,Fe)_{42}Si_{57}O_{265}+82H_2O(?)$.

VARIETIES :—1. *Ordinary*, 2. *Culsageeite*, 3. *Pelhamite.*

Vermiculite, *Kerrite*, *Lucasite*, *Lennilite*, *Hallite*, *Painterite*, *Philadelphite*, *Protovermiculite*, *Vaalite*, *Maconite*, *Dudleyite*, *Pyroscterite*, *Roscite*, *Willcoxite.*

III. SERPENTINE AND TALC DIVISION.

481. Serpentine. Monoclinic; a basic magnesium silicate, $3MgO.2SiO_2.2H_2O$.

VARIETIES :—

A. *In Crystals (probably pseudomorphs)*,
B. *Massive*,
  1. *Ordinary massive*, (a) *Precious*, (b) *Common*,
  2. *Resinous (Retinalite)*,
  3. *Porcellanous*,
  4. *Bowenite*,
C. *Lamellar*,
  5. *Antigorite*,
  6. *Williamsite*,
D. *Thin Foliated*,
  7. *Marmolite*,
  8. *Thermophyllite*,
E. *Fibrous*,
  9. *Chrysotile (Asbestus of commerce)*,
  10. *Picrolite*,
F. *Serpentine Rocks.*

RELATED :—*Totaigite*, *Zöblitzite*, *Metaxoite*, *Hydrophite*, *Aphrodite*, *Cerolite*, *Limbachite.*

482. Deweylite. Amorphous; a hydrous basic magnesium silicate, $4MgO.3SiO_2.6H_2O$.

483. Genthite. Amorphous; a hydrous basic nickel and magnesium silicate, $2NiO.2MgO.3SiO_2.6H_2O$.

RELATED :—*Röttisite.*

483A. Garnierite. Amorphous; a hydrated magnesium and nickel silicate, $H_2(Ni,Mg)SiO_4 + aq.(?)$.

RELATED :—*De Saulesite*, *Pimelite*, *Alipite*, *Refdanskite.*

484. Talc. Orthorh. or monoc.; an acid magnesium metasilicate, $H_2O.3MgO.4SiO_2$.

VARIETIES :—

1. *Foliated, Talc*,
2. *Massive, Steatite or Soapstone*,
  (a) *Potstone*,
  (b) *French Chalk*,
  (c) *Indurated talc*,
3. *Pseudomorphous*,
  (a) *Fibrous*,
  (b) *Rensselaerite*,
  (c) *Pyrallolite.*

RELATED :—*Talcoid.*

485. Sepiolite. Compact; a basic magnesium silicate, $2H_2O.2MgO.3SiO_2$.
486. Connarite. Hexagonal(?); a hydrous nickel silicate, $2H_2O.2NiO_2.3SiO_2$(?).
487. Spadaite. Massive; a hydrous magnesium silicate, $5MgO.6SiO_2.4H_2O$(?).
488. Saponite. Massive; a hydrous magnesium and aluminium silicate(?).
489. Celadonite. Earthy; an iron, magnesium and potassium silicate.
490. Glauconite. Amorphous; a hydrous iron and potassium silicate essentially.
491. Pholidolite. Minute scales; a basic potassium, iron, magnesium and aluminium silicate, $5H_2O.K_2O.12(Fe,Mg)O.Al_2O_3.13SiO_2$(?).

IV. KAOLIN DIVISION.

492. Kaolinite. Monoclinic; a basic aluminium silicate, $2H_2O.Al_2O_3.2SiO_2$.

VARIETIES :—
1. *Crystals,*
2. *Ordinary* :— (a) *Argilliform,* (b) *Fariniform,* (c) *Lithomarge,* 3. *Ferruginous.*

RELATED :—*Meerschaluminite, Rectorite, Leverrierite.*

493. Halloysite. Massive; a hydrous basic aluminium silicate, $2H_2O.Al_2O_3.2SiO_2+aq$.
VARIETIES :—1. *Ordinary,* 2. *Smectite,* 3. *Lenzinite,* 4. *Bole.*
494. Newtonite. Rhomb.; a hydrous basic aluminium silicate, $Al_2O_3.2SiO_2.5H_2O$.
495. Cimolite. Amorphous; a hydrous aluminium silicate, $2Al_2O_3.9SiO_2.6H_2O$.
496. Montmorillonite. Massive; a hydrous basic aluminium silicate, $H_2Al_2Si_4O_{12}+n(aq)$(?).
VARIETIES :—1. *Montmorillonite,* 2. *Stolpenite.*
RELATED :—*Razoumorskyn.*
497. Pyrophyllite. Monoclinic (?); a basic aluminium silic., $H_2O.Al_2O_3.4SiO_2$.
VARIETIES :—1. *Foliated or radiated,* 2. *Compact massive.*
RELATED :—*Gümbelite, Neurolite, Biharite.*
498. Allophane. Amorphous; hydrous aluminium silicate, $Al_2SiO_5+5H_2O$.
RELATED :— *Kieselaluminite, Sulfatallophan, Plumballophane, Carolathine, Samoite.*
499. Collyrite. Amorphous; a hydrous aluminium silicate, $2Al_2O_3.SiO_2.9H_2O$.
RELATED :—*Dillnite.*
500. Schrotterite. Amorphous; a hydrous aluminium silicate, $8Al_2O_3.3SiO_2.30H_2O$.
RELATED :—*Scarbroite.*

APPENDIX TO CLAYS.

Sinopite,	*Rhodalite,*	*Oravitzite,*
Melinite,	*Sphragidite,*	*Hverlera,*
Ochran,	*Ehrenbergit,*	*Wolchonskoite,*
Plinthite,	*Portite,*	*Miloschite,*
Smectite,	*Teratolite,*	*Selwynite,*
Fuller's Earth,	*Catlinite,*	*Chrome Ocher.*
Malthacite,	*Keffekilite,*	

V. CONCLUDING DIVISION.

501. Cenosite. Orthorhombic or monoclinic; a hydrous calcium and yttrium silicate and carbonate, $Ca(Y,Er)_2(SiO_3)_4.CaCO_3.2H_2O$.
502. Thaumasite. Tetragonal or hexagonal; a hydrous calcium silicate, carbonate and sulphate, $CaSiO_3.CaCO_3.CaSO_4.15HO_2$.
503. Uranophane. Orthorhombic; a hydrous uranium and calcium silicate, $CaO.2UO_3.2SiO_2+6H_2O$.
504. Chrysocolla. Cryptocrystalline; hydrous copper silicate, $CuSiO_3+2H_2O$.

VARIETIES :—
1. *Ordinary,*
2. *Dillenburgite,*
3. *Copper pitch-blende,*
4. *Pilarite,*
5. *Demidovite,*
6. *Cyanochalcite,*
7. *Asperolite,*

RELATED :—*Kupferblau.*
505. Chloropal. Amorphous; a hydrated iron silicate, $Fe_2O_3.3SiO_2.5H_2O$(?).
VARIETIES :—1. *Ordinary,* 2. *Nontronite,* 3. *Pinguite,* 4. *Fettbol,* 5. *Graminite.*
RELATED :—*Glasurite, Protonontronite, Anthosiderite.*

506. Hisingerite. Amorphous; a hydrated ferric silicate.
VARIETIES:—1. *Hisingerite*, 2. *Degeröite*, 3. *Scotiolite.*
RELATED:—*Gillingite, Jollyte, Melanosiderite, Avasite.*

507. Bementite. Stellate masses; a hydrous manganese silicate, $2MnSiO_3.H_2O$ (approximately).

508. Caryopilite. Massive; a hydrous manganese silicate, $4MnO.3SiO_2.3H_2O$ (approximately).

509. Neotocite. Amorphous; a hydrous manganese and iron silicate.
RELATED:—*Penwithite.*

APPENDIX TO HYDROUS SILICATES.

Allophite,
Antillite,
Aquacreptite,
Arctolite,
Balvraidite,
Barettite,
Bhreckite,
Bravaisite,
Chonicrite,
Davreuxite,
Dermatin,
Duporthite,
Ephesite,
Lesleyite,
Forchhammerite,
Ginilsite,
Groppite,
Hydrosilicite,
Leidyite,
Leucotile,
Lillite,
Melopsite,
Næsumite,
Nefedieffite,
Neolite,
Nigrescite,
Pelhamine,
Persbergite,
Picrofluite,
Picrosmine,
Pihlite,
Pilinite,
Pilolite,
Polyhydrite,
Pyknotrop,
Pyroïdesine,
Quincite,
Restormelite,
Rubislite,
Stübelite,
Talcosite,
Venerite,
Xylotile.

Titano-silicates, titanates.

510. Titanite. Monoclinic; calcium titano-silicate, $CaO.TiO_2.SiO_2$.
VARIETIES:—
1. *Ordinary:—*
   (a) *Titanite,*
   (b) *Sphene,*
   (c) *Ligurite,*
   (d) *Spinthere,*
   (e) *Lederite,*
   (f) *Titanomorphite,*
2. *Manganesian, Greenovite,*
3. *Containing yttrium or cerium,*
   (a) *Grothite,*
   (b) *Alshedite,*
   (c) *Eucolite-titanite.*

ALTERS TO:—Rutile, Octahedrite, Perovskite, Xanthitane.
RELATED:—*Pyromelane, Castellite.*

511. Keilhauite. Monoclinic; a calcium, aluminium, ferric iron and yttrium titano-silicate, $15CaSiTiO_5.(Al,Fe,Y)_2(Si,Ti)O_5(?)$.

512. Guarinite. Orthorhombic; calcium titano-silicate, $CaO.TiO_2\ SiO_2$.

513. Tscheffkinite. Massive; chiefly a thorium and cerium metals titano-silicate.

514. Astrophyllite. Orthorhombic; a sodium, potassium, iron and manganese titano-silicate, $(Na,K)_4(Fe,Mn)_4Ti(SiO_4)_4$.

515. Johnstrupite. Monoclinic; a complex cerium, calcium and sodium titano-fluo-silicate.

516. Mosandrite. Monoclinic; a cerium, calcium and sodium titano-fluo-silicate.

517. Rinkite. Monoclinic; a sodium, calcium and cerium titano-fluo-silicate, $(F_8Ti_4)Na_9Ca_{11}Ce_3(SiO_4)_{12}(?)$.

518. Perovskite. Isometric or pseudo-isometric; calcium titanate, $CaTiO_3$.

519. Dysanalyte. Isometric; a calcium and iron titano-niobate, approximately $6(Ca,Fe)TiO_3.(Ca,Fe)Nb_2O_6$.
Hydrotitanite is an altered Dysanalyte.

3. Niobates, Tantalates.

1. PYROCHLORE GROUP. Isometric.

520. Pyrochlore. Isometric; chiefly calcium and cerium niobate with titanium, thorium and sodium fluoride.

520A. Koppite. Isometric; essentially a calcium and cerium pyroniobate.

521. Hatchettolite. Isometric; uranium tantalo-niobate.

522. Microlite. Isometric; essentially calcium pyrotantalate, $Ca_2Ta_2O_7$.
RELATED :—*Pyrrhite.*

2. FERGUSONITE GROUP. Tetragonal.

523. Fergusonite. Tetragonal; essentially yttrium, erbium, cerium, uranium, iron and calcium metaniobate and tantalate, $(Y,Er,Ce)(Nb,Ta)O_4$.
RELATED :—*Rutherfordite, Kochelite.*
524. Sipylite. Tetragonal; chiefly erbium niobate, $ErNbO_4$.
RELATED :—*Adelpholite.*

3. COLUMBITE GROUP. Orthorhombic.

525. Columbite. Orthorhombic; ferrous iron and manganese niobate, $(Fe,Mn)Nb_2O_6$.
NOTE :—Columbite graduates chemically into the next species, Tantalite.
526. Tantalite. Orthorhombic; iron tantalate, $FeTa_2O_6$.
526A. Skogbölite. Orthorhombic; essentially an iron tantalate, $FeTa_2O_6$.
RELATED :—*Ixiolite, Mengite, Hermannolite, Ferro-ilmenite.*
527. Tapiolite. Tetragonal; an iron tantalate and niobate, $Fe(Ta,Nb)_2O_6$.

4. SAMARSKITE GROUP. Orthorhombic.

528. Yttrotantalite. Orthorhombic; chiefly a yttrium metals and iron tantalo-niobate.
529. Samarskite. Orthorhombic; chiefly yttrium, cerium, iron and uranium tantalo-niobate.
RELATED :—*Nohlite, Vietinghofite.*

530. Ånnerödite. Orthorh.; essentially a uranium and yttrium pyro-niobate.
531. Hielmite. Orthorhombic; an iron, yttrium, manganese and calcium stanno-tantalate and niobate.

AESCHYNITE GROUP. Orthorhombic.

532. Aeschynite. Orthorhombic; a cerium metals, iron and calcium niobate and thoro-titanate, $\overset{III}{R}_2Nb_4O_{13}.\overset{III}{R}_2(Ti,Th)_5O_{13}(?)$.
533. Polymignite. Orthorhombic; a cerium metals, iron and calcium niobate and titano-zirconate, $5RTiO_3.5RZrO_3.R(Nb,Ta)_2O_6(?)$.
534. Euxenite. Orthorhombic; an yttrium, erbium, cerium and uranium niobate and titanate, $\overset{III}{R}(NbO_3)_3.\overset{III}{R}_2(TiO_3)_3.\frac{3}{2}H_2O(?)$.
535. Polycrase. Orthorhombic; an yttrium, erbium, cerium and uranium niobate and titanate, $\overset{III}{R}(NbO_3)_3.2\overset{III}{R}(TiO_3)_3.3H_2O$.

APPENDIX TO NIOBATES, TANTALATES.

Arrhenite, *Blomstrandite,* *Rogersite.*

4. Phosphates, Arsenates, Vanadates, Antimonates.

A. ANHYDROUS PHOSPHATES, VANADATES, ARSENATES, ANTIMONATES.

1. INTRODUCTORY SUBDIVISION.

536. Xenotime. Tetragonal; essentially yttrium phosphate, $Y_2O_3.P_2O_5$.
537. Monazite. Monoclinic; essentially phosphate of the cerium metals, $(Ce,La,Di)PO_4$, with some ThO_2.
RELATED :—*Kårarfvеite.*
538. Berzeliite. Isometric; calcium magnesium and manganese orthoarsenate, $(Ca,Mg,Mn)_3As_2O_8$.
RELATED :—*Pseudoberzeliite.*
539. Monimolite. Isometric; a lead, iron and calcium antimonate, $(Pb,Fe,Ca)_3Sb_2O_8$.
VARIETIES :—1. *Contains calcium,* 2. *Without calcium.*

540. Caryinite. Massive, monoclinic(?); a lead, manganese, calcium and magnesium arsenate, $(Pb,Mn,Ca,Mg)_3As_2O_8$(?).

541. Carminite. Orthorhombic; a lead and iron arsenate, $Pb_3As_2O_8.10FeAsO_4$(?)

542. Pucherite. Orthorhombic; bismuth vanadate, $Bi_2O_3.V_2O_5$.

2. TRIPHYLITE GROUP. Orthorhombic.

543. Triphylite. Orthorhombic; an iron, manganese and lithium phosphate, $Li(Fe,Mn)PO_4$.

NOTE :—Triphylite graduates chemically into the next species, Lithiophilite.

544. Lithiophilite. Orthorhombic; a manganese, iron and lithium phosphate, $Li(Mn,Fe)PO_4$.

RELATED :—*Melanchlor, Heterosite, Pseudotriplite, Alluaudite.*

545. Natrophilite. Orthorh.; sodium and manganese phosphate, $Na_3PO_4.Mn_3P_2O_8$.

546. Beryllonite. Orthorh.; beryllium and sodium phosphate, $Na_3PO_4.Be_3P_2O_8$.

547. Herderite. Orthorhombic; a beryllium and calcium fluo-phosphate, $(CaF)BePO_4$.

548. Hamlinite. Rhombohedral; an aluminium or beryllium phosphate with water and fluorine.

3. APATITE GROUP. Hexagonal with pyramidal hemihedrism.

549. Apatite. Hexagonal; calcium phosphate with either calcium fluoride or calcium chloride, $3Ca_3P_2O_8+CaF_2$ or $3Ca_3P_2O_8+CaCl_2$.

VARIETIES :—(Divided into fluor-apatites and chlor-apatites.)

1. *Ordinary crystallized:*
   (a) *Asparagus-stone,* (b) *Lasurapatite,* (c) *Francolite,* (d) *Cupro-apatite,*
2. *Manganapatite,*
3. *Fibrous (Phosphorite),*
4. *Earthy apatite,*
5. *Pseudoapatite,*
6. *Staffelite.*

RELATED :—*Osteolite, Epiphosphorite, Talc-apatite, Hydroapatite, Phosphatic Nodules, Guano.*

550. Pyromorphite. Hexagonal; lead chloride and phosphate, $3Pb_3P_2O_8.PbCl_2$.

VARIETIES :—

1. *Ordinary:*—
   (a) *Crystals,* (b) *Acicular,* (c) *Concretionary masses,* (d) *Fibrous,* (e) *Granular,* (f) *Earthy.*
2. *Polysphærite,*
   (a) *Miesite,* (b) *Nussierite,* (c) *Cherokine,*
3. *Chromiferous.*
4. *Arseniferous,*
5. *Pseudomorphous,*
   (a) *after galenite,* (b) *after cerussite.*

ALTERS TO :—Galenite, Cerussite, Calamine, Calcite, Limonite.

551. Mimetite. Hexagonal; lead arsenate and lead chloride, $3Pb_3As_2O_8.PbCl_2$.

VARIETIES :—

1. *Ordinary :*—
   (a) *In crystals,* (b) *Capillary,* (c) *Concretionary,*
2. *Calciferous,*
3. *Campylite.*

Endlichite.—Hexagonal; intermediate between Mimetite and Vanadinite. Contains nearly equal portions of lead arsenate and vanadate, with chloride.

552. Vanadinite. Hexagonal; lead vanadate and lead chloride, $3Pb_3V_2O_8.PbCl_2$.

RELATED :—*Hedyphane, Pleonectite.*

4. WAGNERITE GROUP. Monoclinic.

553. Wagnerite. Monoclinic; magnesium fluo-phosphate, $Mg_3P_2O_8.MgF_2$.

VARIETIES :—1. *Wagnerite,* 2. *Kjerulfine.*

RELATED :—*Cryphiolite.*

554. Spodiosite. Orthorhombic(?); a calcium fluo-phosphate, $Ca_3P_2O_8.CaF_2$(?).

555. Triplite. Monoclinic; an iron, manganese, calcium and magnesium fluo-phosphate, $R_3P_2O_8.RF_2$.

VARIETIES :—1. *Ordinary,* 2. *Zwieselite,* 3. *Talktriplite.*

RELATED :—*Griphite, Sarcopside.*

556. Triploidite. Monoclinic; basic manganese and iron phosphate, $4(Mn,Fe)O.P_2O_5.H_2O$.

557 Sarkinite. Monoclinic; basic manganese arsenate, $4MnO.As_2O_5.H_2O$.

VARIETIES :—1. *Sarkinite,* 2. *Polyarsenite.*

5. AMBLYGONITE GROUP.

558. Durangite. Monoc.; a sodium and aluminium fluo-arsenate, $AlAsO_4.NaF$.
559. Amblygonite. Tric.; an aluminium and lithium fluo-phosphate, $AlPO_4.LiF$.

B. ACID AND BASIC PHOSPHATES, ARSENATES, ETC.

560. Monetite. Triclinic; acid calcium phosphate, $2CaO.P_2O_5.H_2O$.
RELATED :—*Natrophite.*

OLIVENITE GROUP. Orthorhombic.

561. Olivenite. Orthorhombic; basic copper arsenate, $4CuO.As_2O_5.H_2O$.
VARIETIES :—(a) *Crystallized*, (b) *Fibrous* (*wood-copper*), (c) *Earthy.*
562. Libethenite. Orthorhombic; basic copper phosphate, $4CuO.P_2O_5.H_2O$.
563. Adamite. Orthorhombic; basic zinc arsenate, $4ZnO.As_2O_5.H_2O$.
564. Descloizite. Orthorhombic; basic lead and zinc vanadate, $(Pb,Zn)_2(OH)VO_4$.
VARIETIES :—1. *Ordinary crystals*, 2. *Cuprodescloizite.*
RELATED :—*Eusynchite*, *Dechenite.*
565. Calciovolborthite. Probably a basic copper and calcium vanadate, $4(Cu,Ca)O.V_2O_5.H_2O(?)$.
566. Brackebuschite. Monoclinic(?); perhaps a basic lead, iron and manganese vanadate, $(Pb,Fe,Mn)_3V_2O_8.H_2O(?)$.
567. Psittacinite. Crypto-crystalline coating; a hydrous, basic, lead and copper vanadate, $(Pb,Cu)_4(OH)_2V_2O_8.H_2O(?)$.
RELATED :—*Mottramite*, *Chileite*, *Vanadiolite*, *Wicklowite.*
568. Erinite. Crystalline groups; basic copper arsenate, $5CuO.As_2O_5.2H_2O$.
569. Dihydrite. Monoclinic or triclinic; essentially a basic copper phosphate, $5CuO.P_2O_5.2H_2O$.
570. Pseudomalachite. Massive; a basic copper phosphate, $6CuO.P_2O_5.3H_2O(?)$.
RELATED :—*Ehlite.*
571. Clinoclasite. Monoclinic; a basic copper arsenate, $6CuO.As_2O_5.3H_2O$.
572. Chondrarsenite. Embedded grains; a basic manganese arsenate, perhaps $6MnO.As_2O_5.3H_2O$.
RELATED :—*Xantharsenite.*
573. Dufrenite. Orthorh.; a basic ferric iron phosphate, partly $2Fe_2O_3.P_2O_5.3H_2O$.
574. Lazulite. Monoclinic; a basic iron, aluminium and magnesium phosphate, $(Fe,Mg)O.Al_2O_3.P_2O_5.H_2O$.
575. Tavistockite. Microscopic acicular crystals; a basic calcium and aluminium phosphate, $3CaO.Al_2O_3.P_2O_5.3H_2O$.
576. Cirrolite. Compact; a basic calcium and aluminium phosphate, $6CaO.2Al_2O_3.3P_2O_5.3H_2O(?)$.
577. Arseniosiderite. Tetragonal or hexagonal(?); basic iron and calcium arsenate, $6CaO.4Fe_2O_3.3As_2O_5.9H_2O$.
578. Allactite. Monoclinic; basic manganese arsenate, $7MnO.As_2O_5.4H_2O$.
579. Synadelphite. Monoclinic; basic manganese and aluminium arsenate, $2(Al,Mn)AsO_4.5Mn(OH)_2$.
580. Flinkite. Orthorh.; basic manganese arsenate, $4MnO.Mn_2O_3.As_2O_5.4H_2O$.
581. Hematolite. Rhombohedral; a basic manganese and aluminium arsenate, $(AlMn)AsO_4.4Mn(OH)_2$.
582. Arseniopleite. Massive; a basic manganese, calcium, lead, magnesium and iron arsenate, $9(Mn,Ca,PbMg)O.(MnFe)_2O_3.3As_2O_5.3H_2O(?)$.
RELATED :—*Pleurasite.*
583. Manganostibiite. Orthorhombic (?); basic manganese antimonate, $10MnO.Sb_2O_5(?)$.
RELATED :—*Ferrostibian*, *Stibiatil.*
584. Atelestite. Monoclinic; basic bismuth arsenate, $3Bi_2O_3.As_2O_5.2H_2O$.

C. HYDROUS PHOSPHATES, ARSENATES, ETC.—NORMAL DIVISION.

585. Struvite. Orthorhombic; hydrous magnesium and ammonium phosphate, $NH_4MgPO_4+6H_2O$.
RELATED (*Guano Minerals*) :—

Guanapite,	*Oxammite*,	*Epiglaubite*,	*Dittmarite*,
Guanoxalate,	*Phosphammite*,	*Redondite*,	*Müllerite.*

586. Collophanite. Amorphous; hydrous calcium phosphate, $3CaO.P_2O_5.H_2O$.
RELATED :—*Pyrophosphorite.*
587. Hopeite. Orthorhombic; probably hydrous zinc phosphate, $Zn_3P_2O_8+H_2O$.
588. Dickinsonite. Monoclinic; a hydrous manganese, iron, sodium, calcium, potassium and lithium phosphate, $3(Mn,Fe,Na_2,Ca,K_2,Li_2)_3P_2O_8+H_2O$.
589. Fillowite. Monoclinic; a hydrous manganese, iron, calcium and sodium phosphate, $3(Mn,Fe,Ca,Na_2)_3P_2O_8+H_2O$.

ROSELITE GROUP. Triclinic.

590. Roselite. Triclinic; hydrous calcium, cobalt and magnesium arsenate, $(Ca,Co,Mg)_3As_2O_8.2H_2O$.
591. Brandtite. Triclinic; hydrous calcium and manganese arsenate, $2CaO.MnO.As_2O_5.2H_2O$.
592. Fairfieldite. Triclinic; hydrous calcium and manganese phosphate, $Ca_2MnP_2O_8+2H_2O$.
593. Messelite. Tric.; hydrous calcium and iron phosphate, $(Ca,Fe)P_2O_8+2\frac{1}{2}H_2O$.
594. Reddingite. Orthorhombic; hydrous manganese phosphate, $Mn_3P_2O_8+3H_2O$.
595. Picropharmacolite. Spherical; hydrous calcium and magnesium arsenate, $(Ca,Mg)_3As_2O_8+6H_2O$.
596. Trichalcite. Radiating and dendritic; hydrous copper arsenate, $Cu_3As_2O_8+5H_2O$.
RELATED :—*Lavendulan, Chlorotile.*

VIVIANITE GROUP. Monoclinic.

597. Vivianite. Monoclinic; hydrous ferrous iron phosphate, $Fe_3P_2O_8+8H_2O$.
598. Symplesite. Monoclinic; hydrous iron arsenate, probably $Fe_3As_2O_8+8H_2O$.
599. Bobierrite. Monclinic; hydrous magnesium phosphate, $Mg_3P_2O_8+8H_2O$.
600. Hœrnesite. Monoclinic; hydrous magnesium arsenate, $Mg_3As_2O_8+8H_2O$.
601. Erythrite. Monoclinic; hydrous cobalt arsenate, $Co_3As_2O_8+8H_2O$.
VARIETIES :—1. *Crystallized*, 2. *Earthy* (*cobalt bloom*).
602. Annabergite. Monoclinic; hydrous nickel arsenate, $Ni_3As_2O_8+8H_2O$.
603. Cabrerite. Monoclinic; hydrous nickel and magnesium arsenate, $(Ni,Mg)_3As_2O_8+8H_2O$.
604. Köttigite. Monoclinic; hydrous zinc arsenate, $Zn_3As_2O_8+8H_2O$. Cobalt and nickel replace some zinc.
605. Rhabdophanite. Massive; a hydrous phosphate of the cerium and yttrium metals, $(La,Di,Y)PO_4+H_2O$.
606. Churchite. Monoclinic (?); a hydrous cerium, didymium and calcium phosphate, $CePO_4+4H_2O$.

SCORODITE GROUP. Orthorhombic.

607. Scorodite. Orthorhombic; hydrous ferric iron arsenate, $Fe_2O_3.As_2O_5.4H_2O$.
ALTERS TO :—Limonite.
RELATED —*Jogynaite.*
608. Strengite. Orthorhombic; hydrous ferric iron phosphate, $Fe_2O_3.P_2O_5.4H_2O$.
609. Phosphosiderite. Orthorhombic; a hydrous ferric iron phosphate, $Fe_2O_3.P_2O_5.3\frac{1}{2}H_2O$.
610. Barrandite. Spheroidal concretions; hydrous aluminium and iron phosphate, $(AlFe)_2O_3.P_2O_5.4H_2O$.
611. Variscite. Orthorhombic; hydrous aluminium phosphate, $Al_2O_3.P_2O_5.4H_2O$.
RELATED :—*Planerite, Amphithalite.*
612. Callainite. Massive; hydrous aluminium phosphate, $Al_2O_3.P_2O_5.5H_2O$.
613. Zepharovichite. Crystalline; a hydrous aluminium phosphate, $AlPO_4.3H_2O$.
RELATED :—*Gibbsite.*
614. Koninckite. Radiated; hydrous ferric iron phosphate, $Fe_2O_3.P_2O_5.6H_2O$.

HYDROUS PHOSPHATES, ETC.—ACID DIVISION.

615. Stercorite. Monoclinic; hydrous acid sodium ammonium phosphate, $HNa(NH_4)PO_4+4H_2O$.
616. Haidingerite. Orthor.; hydrous acid calcium arsenate, $2CaO.As_2O_5.3H_2O$.
617. Pharmacolite. Monoc.; hydrous acid calcium arsenate, $2CaO.As_2O_5.5H_2O$.
618. Brushite. Monoclinic; a hydrous acid calcium phosphate, $2CaO.P_2O_5.5H_2O$.

619. **Metabrushite.** Monoc.; a hydrous acid calcium phosphate, $4CaO.2P_2O_5.7H_2O$.
ALTERED METABRUSHITE:—Zeugite, Ornithite.
620. **Martinite.** Rhomb.; hydrous acid calcium phosphate, $5CaO.P_2O5.\frac{3}{2}H_2O$.
621. **Newberyite.** Orthorhombic; hydrous acid magnesium phosphate, $2MgO.P_2O_5.7H_2O$.
622. **Wapplerite.** Monoclinic (or triclinic); hydrous acid calcium arsenate, $2CaO.As_2O_5.8H_2O$.
RELATED:—*Rösslerite.*
623. **Hannayite.** Triclinic; a hydrous acid magnesium and ammonium phosphate, $(NH_4)_2O.3MgO.2P_2O_5.10H_2O$.
624. **Hureaulite.** Monoclinic; a hydrous acid manganese phosphate, $5MnO.2P_2O_5.5H_2O$.
VARIETIES:—(a) *Brownish-orange (ordinary)*, (b) *Rose-violet*, (c) *Pale rose.*
625. **Forbesite.** Fibro-crystalline; hydrous acid nickel and cobalt arsenate, $H_2(Ni,Co)_2As_4O_8 + 8H_2O$.

HYDROUS PHOSPHATES, ETC.—BASIC DIVISION.

626. **Isoclasite.** Monoc.(?); hydrous basic calcium phosphate, $4CaO.P_2O_5.5H_2O$.
627. **Hemafibrite.** Orthorhombic; hydrous basic manganese arsenate, $6MnO.As_2O_5.5H_2O$.
628. **Conichalcite.** Reniform and massive; a hydrous basic copper and calcium arsenate, perhaps $4(Cu,Ca)O.As_2O_5.1\frac{1}{2}H_2O$.
629. **Bayldonite.** Mammillary concretions; hydrous basic lead and copper arsenate, $4(Pb,Cu)O.As_2O_5.2H_2O$.
630. **Tagilite.** Monoclinic; hydrous basic copper phosphate, $4CuO.P_2O_5.3H_2O$.
631. **Leucochalcite.** Acicular; a hydrous basic copper arsenate, probably $4CuO.As_2O_5.3H_2O$.
632. **Euchroite.** Orthorh.; a hydrous basic copper arsenate, $4CuO.As_2O_5.7H_2O$.
633. **Volborthite.** Six-sided tables; a hydrous basic copper, calcium and barium vanadate, perhaps $(Cu,Ca,Ba)_3(OH)_3VO_4 + 6H_2O$.
634. **Cornwallite.** Massive; a hydrous basic copper arsenate, $5CuO.As_2O_5.3H_2O$.
635. **Tyrolite.** Orthorhombic; a hydrous basic copper arsenate, perhaps $5CuO.As_2O_5.9H_2O$.
636. **Chalcophyllite.** Rhombohedral; hydrous basic copper arsenate, $7CuO.As_2O_5.14H_2O(?)$.
ALTERS TO:—Chrysocolla.
637. **Veszelyite.** Monoclinic(?); a hydrous basic copper and zinc phospho-arsenate, $(CuZn)_7(OH)_8(As,P)_2O_8+5H_2O$.
638. **Ludlamite.** Monoclinic; a hydrous basic iron phosphate, $7FeO.2P_2O_5.9H_2O$.
639. **Wavellite.** Orthorhombic; hydrous basic aluminium phosphate, $3Al_2O_3.2P_2O_5.12H_2O$.
RELATED:—*Lime-wavellite.*
640. **Fischerite.** Orthorhombic; hydrous basic aluminium phosphate, $2Al_2O_3.P_2O_5.8H_2O$.
641. **Peganite.** Orthorhombic; a hydrous basic aluminium phosphate, $2Al_2O_3.P_2O_5.6H_2O$.
642. **Turquois.** Massive; a hydrous basic aluminium phosphate, $2Al_2O_3.P_2O_5.5H_2O$.
643. **Sphærite.** Globular concretions; a hydrous basic aluminium phosphate, perhaps $5Al_2O_3.2P_2O_5.16H_2O$.
644. **Liskeardite.** Massive; hydrous basic aluminium and iron arsenate, $3(Al,Fe)_2O_3.As_2O_5.16H_2O$.
645. **Evansite.** Massive; hydrous basic aluminium phosphate, $3Al_2O_3.P_2O_5.18H_2O$.
RELATED:—*Cœruleolactite, Taranakite, Berlinite, Trolleite, Augelite, Attacolite.*
646. **Pharmacosiderite.** Isometric; hydrous basic iron arsenate, $4Fe_2O_3.3As_2O_5.15H_2O$.
ALTERS TO:—Psilomelane, Limonite, Hematite.
647. **Cacoxenite.** Radiated tufts; hydrous basic iron phosphate, $2Fe_2O_3.P_2O_5.12H_2O$.
648. **Beraunite.** Monoclinic; hydrous basic iron phosphate, $3Fe_2O_3.2P_2O_5.8H_2O$.
VARIETIES:—1. *Beraunite*, 2. *Eleonorite.*
RELATED:—*Globosite, Picite, Delavauxite.*
649. **Childrenite.** Orthorhombic; a hydrous basic iron, aluminium and manganese phosphate, $(Fe,Mn)Al(OH)_2.PO_4 + 2H_2O$.

650. Eosphorite. Orthorhombic; a hydrous basic manganese, iron and aluminium phosphate, $(Mn,Fe)Al(OH)_2PO_4 + 2H_2O$.

651. Mazapilite. Orthorhombic; a hydrous basic iron and calcium arsenate, $3CaO.2Fe_2O_3.2As_2O_5.6H_2O$.

652. Calcioferrite. Monoclinic(?); a hydrous basic iron and calcium phosphate, $6CaO.3Fe_2O_3.4P_2O_5.19H_2O$.

653. Borickite. Reniform, massive; hydrous basic iron and calcium phosphate, $Ca_3Fe_2(PO_4)_4.12Fe(OH)_3 + 6H_2O$(?).

RELATED :—*Richellite.*

654. Liroconite. Monoclinic; a hydrous basic aluminium and copper arsenate, perhaps $18CuO.4Al_2O_3.5As_2O_5.55H_2O$.

655. Chenevixite. Massive; perhaps a hydrous copper and iron arsenate, $2CuO.Fe_2O_3.As_2O_5.3H_2O$.

RELATED :—*Henwoodite.*

656. Chalcosiderite. Triclinic; hydrous copper and ferric iron phosphate, $CuO.3Fe_2O_3.2P_2O_5.8H_2O$.

RELATED :—*Andrewsite.*

657. Goyazite. Tetragonal or hexagonal; hydrous basic calcium and aluminium phosphate, $3CaO.5Al_2O_3.P_2O_5.9H_2O$.

658. Plumbogummite. Hexagonal; a hydrous lead and aluminium phosphate, perhaps $PbO.2Al_2O_3.P_2O_5.9H_2O$.

URANITE GROUP.

659. Torbernite. Tetragonal; hydrous uranium and copper phosphate, $CuO.2UO_3.P_2O_5.8H_2O$.

660. Zeunerite. Tetragonal; hydrous copper and uranium arsenate, $CuO.2UO_3.As_2O_5.8H_2O$.

661. Autunite. Orthorhombic; a hydrous calcium and uranium phosphate, $CaO.2UO_3.P_2O_5.8H_2O$.

662. Uranospinite. Orthorhombic; probably a calcium and uranium arsenate, $CaO.2UO_3.As_2O_5.8H_2O$.

663. Uranocircite. Orthorhombic; hydrous barium and uranium phosphate, $BaO.2UO_3.P_2O_5.8H_2O$.

664. Phosphuranylite. Pulverulent incrustation; hydrous uranium phosphate, $3UO_3.P_2O_5.6H_2O$.

665. Trögerite. Monoclinic; a hydrous uranium arsenate, $3UO_3.As_2O_5.12H_2O$.

RELATED :—*Fritzscheite.*

666. Walpurgite. Triclinic; probably a hydrous basic bismuth and uranium arsenate, $5Bi_2O_3.3UO_3.2As_2O_5.12H_2O$.

667. Rhagite. Crystalline; hydrous bismuth arsenate, perhaps $5Bi_2O_3.2As_2O_5.9H_2O$.

668. Mixite. Acicular; a hydrated basic copper and bismuth arsenate, perhaps $20CuO.Bi_2O_3.5As_2O_5.22H_2O$.

ANTIMONATES; ALSO ANTIMONITES, ARSENITES.

669. Atopite. Isometric; perhaps calcium pyroantimonate, $2CaO.Sb_2O_5$.

RELATED :—*Schneebergite.*

670. Bindheimite. Amorphous; a hydrous lead antimonate.

671. Romeite. Tetragonal; a calcium antimonate, perhaps $CaO.Sb_2O_3$.

672. Nadorite. Orthorhombic; lead chlor-antimonate, $PbSb_2O_4.PbCl_2$.

673. Ecdemite. Tetragonal; perhaps lead chlor-arsenate, $Pb_4As_2O_7.2PbCl_2$.

674. Ochrolite. Orthorhombic; probably lead chlor-antimonate, $Pb_4Sb_2O_7.2PbCl_2$.

675. Trippkeite. Tetragonal; essentially a copper arsenate, $(nCuO,As_2O_3)$.

ANTIMONATES OR ANTIMONITES OF DOUBTFUL CHARACTER:

Ammiolite, *Barcenite*, *Taznite*.
Arequipite, *Coronguite*,

PHOSPHATES OR ARSENATES WITH CARBONATES, SULPHATES, BORATES.

676. Dahllite. Fibrous crusts; hydrous calcium phosphate and carbonate, $2Ca_3P_2O_8.CaCO_3.\frac{1}{2}H_2O$.

RELATED :—*Ciplyte.*

677. Diadochite. Monoclinic; perhaps a hydrous iron sulpho-phosphate, $2Fe_2O_3.2SO_3.P_2O_5.12H_2O$.

VARIETIES:—1. *Ordinary*, 2. *Destinezite.*

678. Pitticite. Reniform and massive; a hydrous ferric iron arsenate and sulphate.

679. Svanbergite. Rhombohedral; a hydrous aluminium and calcium phosphate and sulphate.

680. Beudantite. Rhombohedral; a lead and ferric iron phosphate or arsenate and sulphate.

681. Lindackerite. Orthorhombic; perhaps a hydrous nickel and copper sulphate and arsenate, $3NiO.6CuO.SO_3.2As_2O_5.7H_2O$.

682. Lüneburgite. Flattened masses; hydrous magnesium borate and phosphate, $3MgO.B_2O_3.P_2O_5.8H_2O$.

APPENDIX TO PHOSPHATES, ARSENATES, ETC.

Miriquidite, *Arsenate of nickel* (crystalline), *Arsenate of nickel* (amorphous).

NITRATES.

683. Soda Niter. Rhombohedral; sodium nitrate, $NaNO_3$.

684. Niter. Orthorhombic; potassium nitrate, KNO_3.

685. Nitrocalcite. Efflorescent tufts; hydrous calcium nitrate, $Ca(NO_3)_2+nH_2O$.

686. Nitromagnesite. Effloresences; hyd. magnesium nitrate, $Mg(NO_3)_2+nH_2O$.

687. Nitrobarite. Isometric; barium nitrate, $Ba(NO_3)_2$.

688. Gerhardtite. Orthorhombic; basic copper nitrate, $4CuO.N_2O_5.3H_2O$.

689. Darapskite. Tetragonal; hydrous sodium sulphate and nitrate, $NaNO_3.Na_2SO_4+H_2O$.

690. Nitroglauberite. Fibrous crystalline; hydrous sodium nitrate and sulphate, $6NaNO_3.2Na_2SO_4.3H_2O$.

5. Borates.

691. Nordenskiöldine. Rhombohedral; calcium and tin borate, $CaO.SnO_2.B_2O_3$.

692. Jeremejevite. Hexagonal; aluminium borate, $Al_2O_3.B_2O_3$.

693. Sussexite. Orthorhombic (?); a manganese, zinc and magnesium borate, $2(Mn,Zn,Mg)O.B_2O_3.H_2O$.

694. Ludwigite. Orthorhombic; a magnesium borate with ferrous and ferric iron oxides, perhaps $3MgO.B_2O_3+FeO.Fe_2O_3$.

ALTERS TO:—Limonite.

695. Pinakiolite. Orthorhombic; a magnesium and manganese borate, $3MgO.B_2O_3+MnO.Mn_2O_3$.

696. Hambergite. Orthorhombic; a basic beryllium borate, $4BeO.B_2O_3.H_2O$.

697. Szaibelyite. Acicular; a hydrous magnesium borate, $5MgO.2B_2O_3.1\frac{1}{2}H_2O$.

698. Boracite. Isometric externally, orthorhombic molecularly; magnesium chloroborate, $6MgO.MgCl_2.8B_2O_3$.

VARIETIES:—1. *Crystals*, 2. *Massive.*

699. Rhodizite. Isometric; aluminium and potassium borate chiefly, $(K,Rb,Cs)_2O.2Al_2O_3.3B_2O_3$.

700. Warwickite. Orthorhombic; a magnesium, iron and titanium borate, perhaps $6MgO.FeO.2TiO_2.3B_2O_3$.

701. Howlite. Orthorhombic (?); a calcium silicoborate, $4CaO.5B_2O_3.2SiO_2.5H_2O$.

RELATED:—*Winkworthite.*

702. Lagonite. Incrusting; a hydrous ferric iron borate, $Fe_2O_3.3B_2O_3.3H_2O$.

703. Larderellite. Monoc.; a hydrous ammonium borate, $(NH_4)_2O.4B_2O_3.4H_2O$.

704. Colemanite. Monoclinic; a hydrous calcium borate, $2CaO.3B_2O_3.5H_2O$.

RELATED:—*Priceite*, *Pandermite.*

705. Pinnoite. Tetragonal; a hydrous magnesium borate, $MgO.B_2O_3.3H_2O$.

RELATED:—*Kaliborite.*

706. Heintzite. Monoclinic; a hydrous magnesium and potassium borate, $K_2Mg_4B_{18}O_{32}.16H_2O$ (?).

707. Borax. Monoclinic; a hydrous sodium borate, $Na_2O.2B_2O_3.10H_2O$.

RELATED—*Tincalconite.*

708. Ulexite. Masses of capillary crystals; a hydrous sodium and calcium borate, probably $Na_2O.2CaO.5B_2O_3.16H_2O$.

ALTERS TO :—Gypsum.

RELATED :—*Franklandite, Cryptomorphite.*

709. Bechilite. Crusts; a hydrous calcium borate, $CaO.2B_2O_3.4H_2O$.

RELATED :—*Hayesine.*

710. Hydroboracite. Monoclinic(?); hydrous calcium and magnesium borate, $CaO.MgO.3B_2O_3.6H_2O$.

URANATES.

711. Uraninite. Isometric; uranate of uranyl, lead, generally thorium, often lanthanum and yttrium metals.

VARIETIES :—

1. *Crystallized,*
   (a) *Uranniobite,*
   (b) *Bröggerite,*
   (c) *Cleveite,*
   (d) *Nivenite,*
2. *Massive (Pitchblende).*

ALTERS TO :—Gummite, Uranophane.

RELATED :—*Coracite.*

712. Gummite. Massive; alteration of uraninite, perhaps $(PbCa)U_3SiO_{12}.6H_2O$.

RELATED :—*Yttrogummite, Thorogummite, Chlorothorite.*

713. Uranosphærite. Globular; a hydrous bismuth uranate, $Bi_2O_3.2UO_3.3H_2O$.

6. Sulphates, Chromates, Tellurates.

A. ANHYDROUS SULPHATES, ETC.

714. Mascagnite. Orthorhombic; ammonium sulphate, $(NH_4)_2SO_4$.

715. Taylorite. Crystalline; potassium and ammonium sulphate, $5K_2SO_4.(NH_4)_2SO_4$.

716. Thenardite. Orthorhombic; sodium sulphate, Na_2SO_4.

RELATED :—*Dihydro-thenardite.*

717. Aphthitalite. Rhombohedral; potassium and sodium sulphate, $(K,Na)_2SO_4$.

RELATED :—*Arcanite.*

718. Glauberite. Monoclinic; sodium and calcium sulphate, $Na_2SO_4.CaSO_4$.

BARITE GROUP. Orthorhombic.

719. Barite. Orthorhombic; barium sulphate, $BaSO_4$.

VARIETIES :—

1. *Ordinary :—*
   (a) *Crystals,*
   (b) *Crested,*
   (c) *Columnar,*
   (d) *Globular (Bologna Stone),*
   (e) *Lamellar,*
   (f) *Granular,*
   (g) *Compact,*
   (h) *Earthy,*
   (i) *Stalactitic,*
2. *Fetid,*
3. *Allomorphite,*
4. *Calcareobarite,*
5. *Celestobarite,*
6. *Calstrontbarite,*
7. *Schoarite.*

ALTERS TO :—Calcite, Siderite, Cerussite, Quartz, Limonite, Hematite, Pyrite, Psilomelane, Göthite.

RELATED :—*Leedsite, Dreelite, Eggonite.*

720. Celestite. Orthorhombic; strontium sulphate, $SrSO_4$.

VARIETIES :—

1. *Ordinary :—*
   (a) *Crystals,*
   (b) *Fibrous,*
   (c) *Lamellar,*
   (d) *Granular,*
   (e) *Concretionary.*
   (f) *Earthy,*
2. *Calciocelestite,*
3. *Barytocelestite.*

721. Anglesite. Orthorhombic; lead sulphate, $PbSO_4$.

ALTERS TO :—Cerussite, Mimetite (?), Hydrous Anglesite.

722. Anhydrite. Orthorhombic; anhydrous calcium sulphate, $CaSO_4$.

VARIETIES :—

1. *Ordinary :—*
   (a) *Crystallized,*
   (b) *Fibrous,*
   (c) *Fine granular,*
   (d) *Scaly granular (Vulpinite).*
2. *Pseudomorphous; in cubes after rock-salt.*

723. Zinkosite. Orthorhombic; anhydrous zinc sulphate, $ZnSO_4$.
724. Hydrocyanite. Orthorhombic; cupric sulphate, $CuSO_4$.
725. Crocoite. Monoclinic; lead chromate, $PbCrO_4$.
726. Phœnicochroite. Orthorhombic(?); basic lead chromate, $3PbO.2CrO_3$.
727. Vauquelinite. Monoclinic; a lead phospho-chromate, perhaps $2(Pb,Cu)CrO_4.(Pb,Cu)_3P_2O_8$.
RELATED :—*Jossaite, Tarapacaite, Calcium chromates, Sulphates of mercury.*

SULPHATES WITH CHLORIDES, CARBONATES, ETC.—IN PART HYDROUS.

728. Sulphohalite. Isometric; sodium sulphate and chloride, $3Na_2SO_4.2NaCl$.
729. Caracolite. Orthorhombic(?); perhaps a basic lead chloride and sodium sulphate, $Pb(OH)Cl.Na_2SO_4$.
RELATED :—*Chlorothionite.*
730. Kainite. Monoclinic; a hydrous magnesium and potassium chlor-sulphate, $MgSO_4.KCl+3H_2O$.
731. Connellite. Hexagonal; a hydrous basic copper chlor-sulphate, probably $Cu_{15}(Cl,OH)_4SO_{16}.15H_2O$.
732. Spangolite. Rhombohedral; a basic aluminium and copper chlor sulphate, $(AlCl)SO_4.6Cu(OH)_2+3H_2O$.
733. Hanksite. Hexagonal; sodium sulphato-carbonate, $4Na_2SO_4.Na_2CO_3$.
734. Leadhillite. Monoclinic; a lead sulphato-carbonate, $4PbO.SO_3.2CO_2.H_2O$.(?).
RELATED :—*Susannite.*

B. ACID AND BASIC SULPHATES.

735. Misenite. Fibers; acid potassium sulphate(?), $KHSO_4$.
736. Alumian. Rhombohedral(?); an aluminium sulphate, $Al(AlO)(SO_4)_2$(?).
737. Lanarkite. Monoclinic; basic lead sulphate, $PbSO_4.PbO$.
738. Dolerophanite. Monoclinic; a basic cupric sulphate, probably $2CuO.SO_3$.
739. Caledonite. Orthorhombic; basic lead and copper sulphate, perhaps $2(Pb,Cu)O.SO_3.H_2O$.
740. Brochantite. Orthorhombic; basic copper sulphate, $4CuO.SO_3.3H_2O$.
VARIETIES :—1. *Ordinary crystals;* 2. *Waringtonite.*
741. Linarite. Monclinic; basic lead and copper sulphate, $PbO.CuO.SO_3.H_2O$.
RELATED :—*Antlerite.*

C. HYDROUS SULPHATES.—NORMAL DIVISION.

742. Lecontite. Orthorhombic; hydrous sodium, ammonium and potassium sulphate, $(Na,NH_4,K)_2SO_4+2H_2O$.
RELATED:—*Guanovulite.*
743. Mirabilite. Monoclinic; hydrous sodium sulphate, $Na_2SO_4+10H_2O$.
RELATED :—*Exanthalose.*
744. Kieserite. Monoclinic; hydrous magnesium sulphate, $MgSO_4+H_2O$.
RELATED :—*Abraum salts.*
745. Szmikite. Amorphous; hydrous manganese sulphate, $MnSO_4+H_2O$.
746. Gypsum. Monoclinic; hydrous calcium sulphate, $CaSO_4+2H_2O$.

VARIETIES :—

1. *Crystallized* (*Selenite*),
2. *Fibrous* (*a*) *Satin spar*,
(b) *Plumose*,
3. *Massive* (a) *Alabaster*,
(b) *Scaly-granular*,
(c) *Rock-gypsum.*

ALTERS TO :—Calcite, Malachite, Quartz, Anhydrite.
747. Ilesite. Monoclinic (?); a hydrous manganese, zinc and iron sulphate, $(Mn,Zn,Fe)SO_4+4H_2O$.
748. Epsomite. Orthorhombic; hydrous magnesium sulphate, $MgSO_4+7H_2O$.
RELATED :—*Tauriscite.*
749. Goslarite. Orthorhombic; hydrous zinc sulphate, $ZnSO_4+7H_2O$.
750. Morenosite. Orthorhombic; hydrous nickel sulphate, $NiSO_4+7H_2O$.
RELATED :—*Tecticite, Fauserite.*

MELANTERITE OR COPPERAS GROUP. Monoclinic.

751. **Melanterite.** Monoclinic; hydrous ferrous sulphate, $FeSO_4+7H_2O$.
RELATED:—*Bourbolite.*

752. **Mallardite.** Monoclinic; hydrous manganese sulphate, $MnSO_4+7H_2O$.

753. **Pisanite.** Monoclinic; hydrous iron and copper sulphate, $(Fe,Cu)SO_4+7H_2O$.

754. **Bieberite.** Monoclinic; hydrous cobalt sulphate, $CoSO_4+7H_2O$.
RELATED:—*Cupromagnesite.*

755. **Chalcanthite.** Triclinic; hydrous cupric sulphate, $CuSO_4+5H_2O$.

756. **Syngenite.** Monoclinic; hydrous calcium and potassium sulphate, $CaSO_4.K_2SO_4+H_2O$.

757. **Löweite.** Tetragonal; hydrous magnesium and sodium sulphate, $MgSO_4.Na_2SO_4+2\frac{1}{2}H_2O$.

758. **Blödite.** Monoclinic; hydrous magnesium and sodium sulphate, $MgSO_4.Na_2SO_4+4H_2O$.
VARIETIES:—1. *Ordinary*, 2. *Astrakanite.*

759. **Boussingaultite.** Monoclinic; a hydrous ammonium and magnesium sulphate, $(NH_4)_2SO_4.MgSO_4+6H_2O$.

760. **Picromerite.** Monoclinic; hydrous magnesium and potassium sulphate, $MgSO_4.K_2SO_4+6H_2O$.

761. **Cyanochroite.** Monoclinic; hydrous copper and potassium sulphate, $CuSO_4.K_2SO_4+6H_2O$.

762. **Polyhalite.** Monoclinic (?); hydrous calcium, magnesium and potassium sulphate, $2CaSO_4.MgSO_4.K_2SO_4+2H_2O$.
RELATED:—*Krugite, Mamanite.*

763. **Wattevillite.** Orthorhombic or monoclinic; a hydrous calcium and sodium sulphate, $CaSO_4.Na_2SO_4+4H_2O$.

ALUM AND HALOTRICHITE GROUPS.

764. **Kalinite.** Isometric; hydrous aluminium and potassium sulphate, $K_2SO_4.Al_2(SO_4)_3+24H_2O$.

765. **Tschermigite.** Isometric; hydrous aluminium and ammonium sulphate, $(NH_4)_2SO_4.Al_2(SO_4)_3+24H_2O$.

766. **Mendozite.** Fibrous; hydrous aluminium and sodium sulphate, $Na_2SO_4.Al_2(SO_4)_3+24H_2O$.

767. **Tamarugite.** Fibrous; hydrous aluminium and sodium sulphate, $Na_2SO_4.Al_2(SO_4)_3+12H_2O$.

768. **Pickeringite.** Monoclinic(?); hydrous aluminium and magnesium sulphate, $MgSO_4.Al_2(SO_4)_3+22H_2O$.
RELATED:—*Stüvenite, Sonomaite, Picroalumogene, Dumreicherite, Aromite.*

769. **Halotrichite.** Monoclinic or triclinic; hydrous iron and aluminium sulphate, $FeSO_4.Al_2(SO_4)_3+24H_2O$.

770. **Apjohnite.** Monoclinic(?); hydrous aluminium and manganese sulphate, $MnSO_4.Al_2(SO_4)_3+24H_2O$.
VARIETIES:—1. *Ordinary*, 2. *Bushmanite.*

771. **Dietrichite.** Monoclinic(?); hydrous zinc, iron, manganese and aluminium sulphate, $(Zn,Fe,Mn)SO_4.Al_2(SO_4)_3+22H_2O$.

772. **Coquimbite.** Rhomb.; a hydrous ferric iron sulphate, $Fe_2(SO_4)_3+9H_2O$.

773. **Quenstedtite.** Monoc.; a hydrous ferric iron sulphate, $Fe_2O_3.3SO_3.10H_2O$.

774. **Ihleïte.** Efflorescence; hydrous ferric iron sulphate, $Fe_2(SO_4)_3+12H_2O$.
RELATED:—*Kornelite.*

775. **Alunogen.** Monoclinic; hydrous aluminium sulphate, $Al_2(SO_4)_3+18H_2O$.

776. **Krohnkite.** Monoclinic; hydrous copper and sodium sulphate, $CuSO_4.Na_2SO_4+2H_2O$.
RELATED:—*Phillipite.*

777. **Ferronatrite.** Rhombohedral; hydrous iron and sodium sulphate, $3Na_2O.Fe_2O_3.6SO_3.6H_2O$.

778. **Römerite.** Triclinic; hydrous ferrous and ferric iron sulphate, perhaps $FeSO_4.Fe_2(SO_4)_3+12H_2O$.

C. HYDROUS SULPHATES.—BASIC DIVISION.

779. **Langite.** Orthorhombic; hydrous basic copper sulphate, $4CuO.SO_3.4H_2O$.
RELATED:—*Woodwardite.*

780. Herrengrundite. Monoclinic; hydrous basic copper and calcium sulphate, $CaO.4CuO.2SO_3.6H_2O$.

780A. Arnimite. Acicular; a hydrous basic copper sulphate, $5CuO.2SO_3.6H_2O$.

781. Cyanotrichite (Lettsomite). Orthorhombic; a hydrous basic copper and aluminium sulphate, $4CuO.Al_2O_3.SO_3.8H_2O$.

782. Serpierite. Orthorhombic; a basic copper and zinc sulphate.

783. Castanite. Monoclinic; hydrous basic ferric iron sulphate, $Fe_2O_3.2SO_3.8H_2O$.
RELATED:—*Rubrite.*

784. Copiapite. Monoclinic; a hydrous basic ferric iron sulphate, perhaps $2Fe_2O_3.5SO_3.18H_2O$.

785. Knoxvillite. Orthorhombic (?); a hydrous basic chromium, iron and aluminium sulphate, $3([Fe.Mg]O).4([Fe,Cr,Al]_2O_3).9SO_3.30H_2O$(?).
RELATED:—*Redingtonite.*

786. Utahite. Rhomb.; a hydrous basic ferric iron sulphate, $3Fe_2O_3.3SO_3.4H_2O$.

787. Amarantite. Tric.; a hydrous basic ferric iron sulphate, $Fe_2O_3.2SO_3.7H_2O$.
RELATED:—*Hohmannite, Paposite, Ferric sulphates.*

788. Fibroferrite. Monoclinic(?); a hydrous basic ferric iron sulphate, $Fe_2O_3.2SO_3.10H_2O$.

789. Raimondite. Hexagonal or rhombohedral; a hydrous basic ferric iron sulphate, $2Fe_2O_3.3SO_3.7H_2O$.
RELATED:—*Pastreite, Apatelite.*

790. Carphosiderite. Rhombohedral(?); a hydrous basic ferric iron sulphate, perhaps $3Fe_2O_3.4SO_3.10H_2O$.

791. Aluminite. Monoclinic; a hydrous aluminium sulphate, $Al_2O_3.SO_3.9H_2O$.
RELATED:—*Werthemanite, Winebergite.*

792. Glockerite. Massive; a hydrous basic ferric iron sulphate, $2Fe_2O_3.SO_3.6H_2O$.

793. Felsöbanyite. Orthorhombic; a hydrous basic aluminium sulphate, $2Al_2O_3.SO_3.10H_2O$.

794. Paraluminite. Massive; a hydrous basic aluminium sulphate, $2Al_2O_3.SO_3.15H_2O$(?).
RELATED:—*Pissophanite.*

795. Cyprusite. Hexagonal(?); a hydrous ferric iron and aluminium sulphate, perhaps $7Fe_2O_3.Al_2O_3.10SO_3.14H_2O$.
RELATED:—*Erusibite.*

796. Voltaite. Isometric(?); a hydrous iron, magnesium and aluminium sulphate, $(^{II}Fe,Mg)_5(^{III}Fe,Al,)_4S_{10}O_{41}.15H_2O$(?).
RELATED:—*Pettkoite.*

797. Metavoltine. Hexagonal; a hydrous sodium, potassium and iron sulphate, perhaps $5(K_2,Na_2,Fe)O.3Fe_2O_3.12SO_3.18H_2O$.

798. Botryogen. Monoclinic; a hydrous magnesium, ferrous and ferric iron sulphate, perhaps $MgO.FeO.Fe_2O_3.4SO_3.18H_2O$.

799. Sideronatrite. Orthorhombic; a hydrous sodium and ferric iron sulphate, $2Na_2O.Fe_2O_3.4SO_3.7H_2O$.

800. Alunite. Rhombohedral; hydrous aluminium and potassium sulphate, $K_2O.3Al_2O_3.4SO_3.6H_2O$.

801. Jarosite. Rhombohedral; hydrous potassium and ferric iron sulphate, $K_2O.Fe_2O_3.4SO_3.6H_2O$.
VARIETIES:—1. *Crystallized*, 2. *Concretionary.*
RELATED:—*Bartholomite, Plagiocitrite, Clinophæite, Clinocrocite.*

802. Löwigite. Rounded masses; hydrous potassium and aluminium sulphate, perhaps $K_2O.3Al_2O_3.4SO_3.9H_2O$.
RELATED:—*Ignatievite.*

803. Ettringite. Hexagonal; hydrous calcium and aluminium sulphate, perhaps $6CaO.Al_2O_3.3SO_3.33H_2O$.

804. Quetenite. Monoclinic or triclinic (?); a hydrous magnesium and iron sulphate, $MgO.Fe_2O_3.3SO_3.13H_2O$.

805. Zincaluminite. Hexagonal (?); a hydrous basic zinc and aluminium sulphate. $6ZnO.3Al_2O_3.2SO_3.18H_2O$.
RELATED:—*Enysite, Lamprophanite.*

806. Johannite. Monoclinic; a hydrous uranium and copper sulphate.

807. Uranopilite. Incrustation of minute crystals; a hydrous basic calcium and uranium sulphate, perhaps $CaO.8UO_3.2SO_3.25H_2O$.
RELATED:—*Medjidite, Uranochalcite, Zippeite, Voglianite, Uraconite.*

TELLURATES; ALSO TELLURITES, SELENITES.

808. Montanite. Incrusting; a hydrous bismuth tellurate, $Bi_2O_3.TeO_3.2H_2O$.
809. Emmonsite. Monoclinic; probably a hydrous ferric iron tellurite.
810. Durdenite. Massive; hydrous ferric iron tellurite, $Fe_2O_3.3TeO_2.4H_2O$.
RELATED :—*Ferrotellurite, Magnolite.*
811. Chalcomenite. Monoclinic; hydrous cupric selenite, $CuO.SeO_2.2H_2O$.
RELATED :—*Molybdomenite, Cobaltomenite, Kerstenite, Onofrite.*

7. Tungstates, Molybdates.

812. Wolframite. Monoclinic; an iron and manganese tungstate, $(Fe,Mn)WO_4$.
ALTERS TO :—Scheelite.
RELATED :—*Ferberite.*
813. Hübnerite. Monoclinic; a manganese tungstate, $MnWO_4$.

SCHEELITE GROUP. Tetragonal.

814. Scheelite. Tetragonal; calcium tungstate, $CaWO_4$.
ALTERS TO :—Wolframite, Kaolinite.
815. Cuprotungstite. Granular and crusts; copper tungstate, $CuWO_4$; also copper and calcium tungstate, $(Ca,Cu)WO_4$.
816. Powellite. Tetragonal; essentially calcium molybdate, $CaMoO_4$.
817. Stolzite. Tetragonal; lead tungstate, $PbWO_4$.
818. Wulfenite. Tetragonal; lead molybdate, $PbMoO_4$.
819. Reinite. Tetragonal; iron tungstate, $FeWO_4$.
RELATED :—*Pateraite, Eosite, Achrematite.*
820. Belonesite. Tetragonal; probably magnesium molybdate, $MgMoO_4$.

VII. SALTS OF ORGANIC ACIDS.

OXALATES, MELLATES.

821. Whewellite. Monoclinic; calcium oxalate, $CaC_2O_4+H_2O$.
RELATED :—*Thierschite.*
822. Oxammite. Orthorhombic; ammonium oxalate, $(NH_4)_2C_2O_4+2H_2O$.
823. Humboldtine. Capillary; hydrous ferrous iron oxalate, $2FeC_2O_4+3H_2O$.
RELATED :—*Oxalate of sodium and ammonium.*
824. Mellite. Tetragonal; hydrous aluminium mellate, $Al_2C_{12}O_{12}+_{18}H_2O$.
RELATED :—*Pigotite, Organic salts of iron.*

VIII. HYDROCARBON COMPOUNDS.

The Hydrocarbon compounds in general, with perhaps a few exceptions, are not homogeneous substances, but mixtures, which by the action of solvents or by fractional distillation may be separated into two or more component parts.

1. SIMPLE HYDROCARBONS.

Chiefly members of the Paraffin Series CnH_2n+_2.

Scheererite. Monoclinic; carbon 73%, hydrogen 24%, probably a polymer of marsh gas.
Hatchettite. Massive; carbon 85.55%, hydrogen 14.45%.
RELATED :—*Paraffin, Chrismatite.*
Ozocerite. Waxy; chiefly a higher paraffin, carbon 84.43%, hydrogen 13.69%.
RELATED :—*Zietrisikite, Urpethite, Baikerinite, Neft-gil, Pyropissite, Helenite.*
Fichtelite. Monoclinic; formula doubtful, $C_{15}H_{26}$ to $C_{15}H_{28}$.

Hartite. Triclinic or monoclinic; ratio of C to H=12 : 20.
RELATED :—*Dinite, Ixolyte, Napalite.*

Könlite. Amorphous ; ratio of C to H = 1 : 1, a polymer of benzene.
RELATED :—*Phylloretin, Naphthalene.*

2. OXYGENATED HYDROCARBONS.

Comprise chiefly the numerous kinds of native fossil resins often designated by the general term "Ambers."

Succinite (True Amber). Irregular masses; ratio of C,H,O = 40 : 64 : 4.
RELATED :—*Succinellite.*

Retinite. A generic name, under which are included the following amber-like resins. They contain little or no succinic acid.

Gedanite,	*Duxite,*	*Bucaramangite,*
Glessite,	*Muckite,*	*Rosthornite,*
Rumänite,	*Neudorfite,*	*Copalite,*
Simetite,	*Schraufite,*	*Ambrosine,*
Krantzite,	*Jaulingite,*	*Ajkite,*
Siegburgite,	*Refikite,*	*Wheelerite,*
Walchowite,	*Köflachite,*	*Ionite,*
Chemawinite,	*Ambrite,*	*Euosmite.*

Bathvillite. Amorphous; ratio of C,H,O = 40 : 68 : 4.

RELATED :—

Torbanite,	*Xyloretinite,*	*Guyaquillite,*
Retinellite,	*Scleretinite,*	*Middletonite.*

Tasmanite. Resiniferous shale; carbon 79.34 %, hydrogen 10.41 %, oxygen 4.93 %, sulphur 5.32 %.
RELATED :—*Trinkerite.*

Dysodile. Thin leaves; carbon 69 %, hydrogen 10 %, oxygen 16.9 %, sulphur 2.35 %, nitrogen 1.7 %.

Pyroretinite. Resin-like; carbon 80 %, hydrogen 9.33 %, oxygen 10.67 %.
RELATED :—*Stanekite, Reussinite.*

Leucopetrite. Between resin and wax in characters; $C_{50}H_{84}O_3$.
RELATED :—*Brücknerellite, Anthracoxenite.*

Geomyricite. Wax-like; $C_{34}H_{68}O_2$.

Geocerite. Wax-like; $C_{28}H_{56}O_2$.
RELATED :—*Geocerellite.*

Bombiccite. Triclinic; C_7HO_{13}.
RELATED :—*Hofmannite.*

Idrialite. Crystalline when pure; $C_{80}H_{56}O_2$.
RELATED :—*Aragotite, Posepnyte.*

Rochlederite. Resin-like; carbon 76.79 %, hydrogen 9.06 %, oxygen 14.15 %.
RELATED :—*Native humus acid, Hircite.*

Dopplerite. Amorphous; $C_{12}H_{14}O_6$.
RELATED :—*Phytocollite.*

APPENDIX TO HYDROCARBONS.

Petroleum. Liquid; chiefly consists of members of the paraffin series, CnH_{2n+2}.
RELATED :—*Naphtha, Pittasphalt, Petrolene.*

Asphaltum. Amorphous; composition variable.

Elaterite. Massive; about 85 % carbon, 12-13 % hydrogen.
RELATED :—*Settling stones resin, Berengelite, Bielzite, Piauzite, Wurtzilite, Albertite, Cloustonite, Grahamite, Uintahite.*

Mineral Coal. Compact massive; mainly oxygenated hydrocarbons.
1. *Anthracite.*
2. *Bituminous ;—*
   (a) *Caking or coking coal,*
   (b) *Non-caking coal,*
   (c) *Cannel coal,*
   (d) *Brown coal.*

RELATED :—*Byerite, Huminite, Anthraxolite, Wollongongite.*

COMPLETE SUPPLEMENT

TO

DANA'S CLASSIFICATION.

NEW MINERALS.

The following list includes all new minerals not described in the main text of Dana's *System of Mineralogy* (6th ed., 1892).

In heavy type are given minerals which will probably be accorded the rank of distinct species, although in several cases descriptions are incomplete and their exact position is therefore uncertain.

In italics are those which will probably be classed as varieties of established species, or as sub-species.

In ordinary type will be found a number of old names regarded by Dana as having little claim to recognition.

In the work of compilation, a thorough and systematic search was made through mineralogical literature, dating back to the middle of 1891, and no labor has been spared to make the list complete to date. References are made to the publications in which the original descriptions appeared.

Adelite. *G. För. Förh.*, 13, 781, '91. Massive; a basic calcium and magnesium arsenate, $H_2O.2CaO.2MgO.As_2O_5$.

Aërinite. *Jb. Min.*, 352, 76, 60, '77. Heterogeneous mass, contains water, calcium, iron, aluminium and silica.

Aguilarite. *Am. J. Sc.*, 41, 401, '91. Isometric; silver sulpho-selenide, $Ag_2S.Ag_2Se$.

Andorite. *Zeitschr. Kryst.*, XXIII, 497. Orthorhombic; $AgPbSb_3S_6$ (?).

Anomalite. *Am. Inst. Mng. Eng.*, Phila., '76. Alteration of jeffersonite; contains manganese, cobalt and nickel.

Antochroite. *Zs. Kr.*, 19, 103, '92. Calcium and magnesium silicate.

Ascharite. *Zeitschr. Kryst.*, XXIV, 625, '94. Massive; a hydrous magnesium borate.

Astochite. *G. För. Förh.*, 13, 604, Nov., '91. Monoclinic; basic potassium, sodium, calcium, magnesium and manganese silicate, $(Mg,Mn,Ca)SiO_3+(Na,K,H)_2Si_3$, (an amphibole).

Baddeleyite. *Nature*, Oct. 27, '92. Monoclinic (?); zirconium dioxide, ZrO_2.

Basiliite. *Geol. För. Förh.*, XIV, 307, '92. Blades; a hydrous manganese antimonate, perhaps $(Mn_2O_3)_4Sb_2O_5+7Mn_2O_3.3H_2O$.

Bernardinite. *Ibid.*, 42, 49, '91. "A fungous growth, impregnated by resinous material."

Bixbyite. *A. J. S.*, CLIV, 105, '97. Isometric; mainly iron and manganese oxide.

Bliabergite. *Zs. Kr.*, 27, 601, '97. Orthorhombic; hydrous iron, aluminium and manganese silicate.

Blueite. *J. Am. Chem. Soc.*, XIV, No. 7. Massive; a niccoliferous pyrite.

Bolëite. *C. R.*, 113, 519, Oct. 26, '91. Isometric; a hydrous lead and copper oxychloride with some silver chloride, $Pb,CuCl_2(OH)_2+\frac{1}{3}AgCl$.

Brazilite. *Am. J. Sc.*, 45, 165, '93. Monoclinic; perhaps same as Baddeleyite.

Brewsterlinite. *Phil. Mag.*, 25, 174, '63. Colorless fluid, occurs in various crystals.

Burmite. *Geol. Surv. India*, XXVI, 1, '93. New fossil resin.

Canfieldite. *Am. J. Sc.*, 47, 451, '94. Isometric; $Ag_8(SnGe)S_6$.

Caswellite. *Trans. of N. Y. Ac. of Sci.*, XIII, 180, '94. Monoclinic; a calcium, magnesium, manganese, aluminium and iron silicate. An altered Biotite.

Celestialite. *C. R.*, 81, 1055, '75. Acicular crystals; a sulpho-hydrocarbon.

Chloroarsenian. *Zeits. f. Kryst.*, XXII, 467, '94. Triclinic (?); an anhydrous manganese arsenate (?).

Chondrostibian. *Zeits. f. Kryst.*, XXII, 43. Granular; a hydrous manganese and iron antimonate with some arsenic, $3(MnFe)_2O_3Sb_2O_5+10H_2O$.

Craigtonite. *Min. Mag.*, 5, 30, '82. A blue-black stain on red Scotch granite.

Crossite. *Bull. Dept. Geol. Univ. of Cal.*, I, 181, '94. An aluminium, iron, magnesium and sodium silicate.

Cumengéite. *Soc. Min. Fr.*, XVI, No. 7, p. 184, Nov., '93. Octahedral; $PbCl_2.CuO.H_2O$.

Cuprocalcite. *Bull. Soc. Min.*, 1, 130, '78. A mixture of calcium carbonate and cuprous oxide, $(Cu_2O)_2.CO_2+2CaO.CO_2+H_2O$.

Cuprocassiterite. *Trans. Am. Ins. Mining Engineers.* Supposed new tin mineral.

Cuproiodargyrite. *Zeitschr. Kryst.*, XXIV, 626, '95. Incrusting; a copper and silver iodide, CuI.AgI.

Derbylite. *Min. Mag.*, XI, 176, '97. Orthorhombic; an antimono-titanate of iron, perhaps $FeO.Sb_2O_5+5FeO.TiO_2$.

Dietzeite. *Min. Mag.*, XI, 104, '95. Monoclinic; a calcium iodate and chromate, $7Ca(IO_3)_2.8CaCrO_4$.

Elfstorpite. *Zeits. f. Kryst.*, XXII, 467, '94. A hydrous manganese arsenate (?).

Ellonite. *Min. Mag.*, 5, 30, '82. Powder; impure hydrous magnesium silicate.

Elpidite. *Jb. Min.*, I, 457, '95. Hydrous zirconium and sodium silicate.

Elroquite. *Min. Contr.*, '77. Massive; perhaps aluminia, iron and opaline silica.

Epididymite. *Zeits. für Kryst.*, XXIII, 344, '94. Monoclinic; a basic sodium and beryllium silicate, $H_2O.Na_2O.2BeO.6SiO_2$.

Erilite. *Proc. Ac. Nat. Sc. Phila.*, 292, '80. Minute acicular crystals.

Falkenhaymite. *Vh. G. Reichs.*, 433, '90. Massive; a copper sulphantimonite (?), $3Cu_2S.Sb_2S_3$.

Ferrosilicate. *Shepard.* A ferrous silicate supposed to be present in some meteorites.

Folgerite. *J. Am. Chem. Soc.*, XIV, No. 7. Massive; a nickel iron sulphide, $NiFeS_2$. Identical with Pentlandite according to Penfield.

Footeite. *Proc. Acad. Phila.*, 289, '91. Monoclinic; a hydrous basic copper chloride, perhaps $8Cu(OH)_2.CuCl_2+4H_2O$.

Fouquéite. *Bull. Soc. Min.*, 12, 327, '89. Monoclinic; a basic aluminium, calcium and iron ortho-silicate (essentially an epidote, with but little iron).

Frankeite. *Jahb. f. Min.*, '93, II, 114. Fibrous; chiefly lead, tin, antimony and sulphur, perhaps $Pb_5Sn_2Sb_2S_{12}$.

Fuggerite. *Zs. K.*, 27, 577, '97. Calcium and aluminium sulphate (?).

Ganomatite. *Char.*, 106, '32. In part, an impure iron sinter.

Geikielite. *Nature*, Oct. 27, '92. Magnesium titanate, $MgTiO_3$.

Graphitite. *Ber. d. deutsch Chem. Ges*, XXVI, 890. Pure graphite, C.

Hauchecornite. *Jahrb. Preus. Geol. Landesaustalt*, '91, p. 91. Tetragonal; essentially nickel, bismuth, antimony and sulphur.

Hautefeuillite. *Bull. Soc. Min.*, XVI, 38, '93. Monoclinic; hydrous magnesium and calcium phosphate, $(Mg,Ca)_3P_2O_8+8H_2O$.

Heldburgite. *Zs. Nat. Halle.* 4, 291, 884, '79. Tetragonal.

Hessenbergite. *Sideroxen Hessenberg, Min. Not.*, 7, 4, '66. Monoclinic; a silicate, exhaustively described crystallographically, but constituents undetermined.

Hoeferite. *Min. petr. Mitth.*, XIV, 519, '95. Amorphous; a hydrated ferric silicate, $2Fe_2O_3.4SiO_2.7H_2O$(?).

Howardite. *Shepard.* Iron and magnesium silicate, supposed to be present in certain meteorites.

Hydrobucholzite. *Thomson.* A hydrous aluminium silicate with some calcium sulphate.

Hydrocalcite. *Zeitschr. Kryst.*, XXIV, 196. Needles; a hydrous calcium carbonate, perhaps $CaCO_3+2H_2O$.

Hydroniccite. *Min. Contr.*, '77. Doubtful substance from Texas, Penn. Supposed to be a hydrous nickel oxide.

Hydrosamarskite. *Ak. H. Stockh., Bihang*, 17 (2), No. 1, 8, '91. A hydrated, "gadolinite-earth" samarskite.

Iddingsite. *Bull. Dept. Geol., Univ. of Cal.*, I, 31. Orthorhombic; contains silicon, iron, calcium, magnesium, sodium and water.

Isopyre. An impure opal, formerly classed as a mineral species.

Josephinite. *Am. J. Sc.*, 43, 509, '92. Massive; an iron-nickel.

Kallilite. *Zs. Kr.* 19, 12, '91. Massive; a nickel sulpho-bismuthide, $NiS_2.NiBi_2$.

Kamarezite. *Jahrb. Min.*, I, 115, '95. Crystalline; a hydrated copper sulphate, $(CuOH)_2SO_4.Cu(OH)_2 + 6H_2O(?)$.

Karamsinite. *Rg. Min. Ch.*, 683, '75. Probably calcium, magnesium, potassium, iron, manganese, aluminium and copper silicate.

Kauaiite. *Proc. Acad. Nat. Sci.*, Phila., p. 105, '94. Amorphous; a basic aluminium potassium and sodium sulphate.

Kehoeite. *Am. J. Sc.*, 46, 24, '93. Amorphous; a hydrous zinc and aluminium phosphate.

Knopite. *G. För. Förh.*, XVI, 73, '94. Isometric (?); near perofskite, but contains cerium.

Kulibinite. *Kk. and Dx., Min.*, 2, XIX, '74. Probably a pitchstone.

Kylindrite. *Jahrb. Min.*, II, 115, '93. Capillary crystals; perhaps $Pb_6Sb_2Sn_6S_2$.

Lamprostibian. *Zeits. f. Kryst.*, XXII, 467, '94. Tetragonal (?); an iron and manganese antimonate (?).

Lautarite. *Zs. Kr.*, 19, 447, Oct. 23, '81. Monoclinic; calcium iodate, $Ca(IO_3)_2$.

Lawsonite. *Bull. Dept. Geol., Univ. of Cal.*, I, 301, '95. Orthorhombic; a basic calcium and aluminium silicate, $H_4CaAl_2Si_2O_{10}$.

Leonite. *Zs. deutsch Geol. Gesellschaft*, XLVIII, 632, '96. Monoclinic; hydrous magnesium and potassium sulphate, $MgSO_4.K_2SO_4 + 4H_2O$.

Lewisite. *Min. Mag.*, XI, 80, '95. Isometric; a calcium and iron titano-antimonate, $5CaO.3Sb_2O_5.2TiO_2$ (?)

Lithidionite. *Rend. Accad. Napoli*, 19, 175, Dec., '80. Probably a mixture of quartz with potassium and sodium carbonates.

Lorandite. *Math. Nat. Ber. Ungarn*, XII, '95. Monoclinic; a thallium sulpharsenide, TlAsS(?).

Lossenite. *Zeitschr. Kryst.*, XXIV, 100, '94. Pyramids; contains lead sulphate, iron, arsenic and water, $2PbSO_4.3(FeOH)_3As_2O_3 + 12H_2O(?)$.

Mackintoshite. *Am. J. Sc.*, 46, 98, '93. Tetragonal; mainly oxides of silicon, uranium, thorium and water, $3SiO_2,UO_2,3(\frac{3}{4}ThO_2,\frac{1}{4}RO)3H_2O(?)$.

Magnetostibian. *Zeitschr. Kryst.*, XXIII, 212. Granular, manganese and iron antimonate, $(MnO.FeO)_{35}Sb_2O_5$.(?).

Manganoferrite. *Vogt, Arch. Math. Nat.*, 14, 35, '90. An iron and manganese oxide $(FeMn)_3O_4$, formed in some furnace slags.

Mariposite. *Cal. Acad. Sc.*, 3, 380, '68. A micaceous mineral.

Marshite. *Proc. Roy. Soc. N. S. W.*, XXVI, 326, '92. Tetragonal; probably copper iodide.

Masrite. *Proc. Chem. Soc.*, Apr. 21, '92; *Nature*, May 26. Fibrous; an alum with some cobalt and perhaps a new element, masrium.

Mauzeliite. *Geol. För. Förh.*, XVII, 313, '95. Isometric; a calcium titano-antimonate.

Melanostibian. *Zeitschr. f. Kryst.*, XXI, 246, '93. Massive; perhaps an iron and manganese antimonate, $6(Mn,Fe)O.Sb_2O_3$(?).

Minervite. *Bull. Soc. Min.*, XVII, 132, '94. Aluminium phosphate, $Al_2O_3.P_2O_5.7H_2O$.

Morinite. *Bull. Soc. Min.*, 14, 187, '91. Monoclinic; contains sodium, aluminium and phosphoric acid.

Munkforssite. *Zs. Kr.*, 27, 601, '97. Hydrous aluminium and calcium sulphate and phosphate (?).

Mursinskite. *Min. Russl.*, 9, 341, '86. Tetragonal.

Neptunite. *Geol. För. Förh.*, XV, 195, '93. Monoclinic; sodium and potassium silicate and iron and manganese titanate, $(\frac{3}{4}Na_2 + \frac{1}{4}K_2)Si_4O_9 + (\frac{3}{8}Fe + \frac{5}{8}Mn)TiO_3$(?).

Newboldite. *J. Asiatic Soc. Bengal*, 26, 1129, '47. Probably ferruginous sphalerite.

Niccochromite. *Min. Contr.*, '77. Coating; possibly nickel dichromate.

Nickel. *Comptes Rendus.*, 112, 171, '91. An iron-nickel alloy, Ni_3Fe.

Nickel-skutterudite. *School of Mines Quarterly*, vol. XIV, No. 1. Granular; a nickel, cobalt and iron tri-arsenide, $(Ni,Co,Fe)As_3$.

Northupite. *Am. J. Sc.*, L, 480, '95 and II, 124, '96. Isometric; a magnesium and sodium carbonate and sodium chloride, $MgCO_3.Na_2CO_3.NaCl$.

Offrétite. *Bull. Soc. Min.*, 14, 60, '91. Hexagonal or rhombohedral; hydrous potassium, calcium and aluminium silicate, $(K_2Ca)_2Al_6Si_{14}O_{39}+17H_2O$.

Palagonite. *Vh. Ver. Rheinl.*, 6, 154, '59. A basaltic tufa, formerly classed as a mineral species.

Paramelaconite. *Proc. Acad. Philad.*, 284, '91; Tetragonal; copper oxides, essentially CuO.

Parathorite. *Proc. Am. Assoc.*, 2, 321, '50. Orthorhombic.

Paroligoclase. *Jb. Min.*, 1, 78 ref., '81. Possibly impure scapolite.

Pearceite. *A. J. Sc.*, CLII, 817, '96. Silver sulpharsenite, Ag_9AsS_6.

Pelagosite. *Tschermak, Min. Mitth.*, 1, 174, '78. Probably an alteration of dolomite by sea-water.

Penfieldite. *Am. J. Sc.*, 44, 260, '92. Hexagonal; lead oxychloride, $PbO.2PbCl_2$.

Pirssonite. *Am. J. Sc.*, II, 126, '96. Orthorhombic; a hydrous calcium and sodium carbonate, $CaCO_3.Na_2CO_3.2H_2O$.

Polylite. *Min.*, 1, 495, '36. Massive; perhaps a variety of pyroxene.

Pyrophanite. *G. För. Förh.*, 12, 598, '90. Rhombohedral; a manganese titanate, $MnTiO_3$.

Quirogite. *Anal. Soc. Espan.*, XXIV, '96. Tetragonal; lead and antimony sulphide.

Ransatite. *Zs. Kr.*, 27, 601, '97. Isometric; iron, aluminium, manganese, magnesium and calcium silicate, $3(Mn,Ca,Mg)SiO_3+(Fe,Al)_4Si_3O_{12}$.

Rathite. Zs. Kr., 26, 593, '96. Orthorhombic; contains lead, sulphur, arsenic and antimony.

Resanite. *Ak. H. Stockh.*, 9, No. 12 (Nov., '70). Massive; hydrous basic iron and copper silicate.

Rhodarsenian. Zeits. f. Kryst., XXII, 467, '94. A hydrous manganese, calcium and magnesium arsenate, $(10[MnCaMg]OAs_2O_5)+10([MnCaMg]OH_2O)$.

Rhodophosphite. Soc. Min. Fr., XIX, 31, '96. Contains calcium, manganese and iron phosphates.

Roeblingite. *Am. J. Sc.*, III, 413, '97. Masses of prismatic crystals; a hydrous calcium silicate containing sulphur dioxide and lead, possibly $H_{10}Ca_7Pb_2Si_5S_2O_{28}$.

Roumanite. Soc. Min. Fr., XIX, '96.

Rowlandite. *Am. J. Sc.*, 42, 430, '91. Massive; yttrium silicate, $2Y_2O_3.3SiO_2$.

Salvadorite. *Zs. Kr.*, 26, 16, '96. Monoclinic; hydrous iron and copper sulphate, $FeSO_4.7H_2O.2(CuSO_4.7H_2O)$.

Sanguinite. *Min. Mag.*, 9, 182, '90. Hexagonal or rhombohedral; a silver sulpharsenite.

Sarawakite. *Min. Mitth.*, 300, '77. Probably tetragonal; may be antimony chloride.

Sjogruvfite. *Ibid.* Crystalline granules; a manganese arsenate, $2([MnCaPb]O)_3.As_2O_5+Fe_2O_3.As_2O_5+6H_2O$.

Snarumite. B. H. Ztg., 24, 364, '65. Massive; mainly aluminium silicate.

Stellarite. How. A "stellar coal." Dawson regards it as an earthy bitumen.

Stibiotantalite. Ibid., p. 205. Contains tantalium, niobium and antimony.

Sulfoborite. *Sitz. k. preuss., Akad. Wiss.*, XLIV, 967, '93. Orthorhombic; a hydrous magnesium sulphate and borate, $3MgSO_4.2Mg_2B_4O_9.12H_2O$.

Sundtite. *Zeitschr. Kryst.*, XXI, 193, '93. Orthorhombic; silver and iron sulphantimonate, $(Ag_2,Fe)S.Sb_2S_5(?)$.

Svabite. *G. För. Förh.*, 13, 789, '91. Hexagonal; a hydrous calcium arsenate perhaps $H_2O.10CaO.3As_2O_5$.

Sychnodymite. *Zs. Kr.*, 19, 17, '91. Isometric; copper and cobalt sulphide, essentially $(Co,Cu)_4S_5$.

Tammite. *Chem. News*, 26, 13, July, '72. A ferro tungstine (?).

Telaspyrine. *Contrib. Min.*, '77. Pyrite containing tellurium.

Tequezquite. *Naturaleza*, 3, 239–246, '75. An efflorescence of sodium salts chiefly.

Tetragophosphite. *Soc. Min. Fr.*, XIX, 31, '96. Hydrous aluminium, iron, manganese, magnesium and calcium phosphate, $[(Fe,Mn,Mg,Ca)O]_3P_2O_5.(Al_2O_3)P_2O_5+3H_2O$.

Thrombolite. *J. pr. Ch.*, 15, 321, '38. Amorphous; probably only a mixture.

Tilasite. Geol. För. Förh., XVII, 291, '95. Granular; a calcium and magnesium fluo-arsenate, $(CaF)MgAsO_4$.

Umangite. *Zs. Kr.*, 19, 269, '91. Massive; copper selenide, $CuSe.Cu_2Se$.

Valaite. *Jb. G. Reichs*, 17, 210, '67. Perhaps hexagonal; a resin.

Valleite. *Bull. Acad. Sci. Belg.*, '96, 32, 536. Orthorhombic; a magnesium, calcium, iron and manganese silicate, RO,SiO_2.

Vesbine. *Att. Acad. Napoli*, Dec. 13, '79. Yellow crust on lava of 1631, Vesuvius, possibly contains new element, *Vesbium*.

Wardite. *Am. J. Sc.*, II, 154, '96. Massive; a hydrous basic aluminium phosphate, $Al_2(OH)_3PO_4+\frac{1}{2}H_2O$.

Webnerite. *Zeitschr. Kryst.*, XXIV, 125, '94. Lead sulphantimonate, $PbS.Sb_2S_3$.

Wellsite. *Am. J. Sc.*, III, 443, '97. Monoclinic; a hydrous aluminium, barium, strontium, calcium, magnesium, potassium and sodium silicate, perhaps $R''Al_2Si_3O_{10}.3H_2O$.

Whartonite. *J. Am. Chem. Soc.*, XIV, No. 7. Granular; perhaps a nickel-iron disulphide, $(Fe,Ni)S_2$.

Willyamite. *Rec. Geol. Surv., N. S. W.*, IV, 21, '94. Cobalt and nickel sulphantimonide, (NiCo)S(CoNi)Sb.

Xiphonite. *Acad. Sci. Acireale*, V, '93. Perhaps a new amphibole.

Zircarbite. *Contrib. Min.*, '77. Massive.

Zirkelite. *Min. Mag.*, XI, 86, '95. Isometric; a calcium zirconate and titanate.

X.

METALLIC CLASSIFICATION OF MINERALS.

Showing the Various Combinations in Which the Metals Occur in Nature.

Under each metal, with its salts as sub-headings, are mentioned the mineral species in which it is a constituent. Several elements which are acidic in character, but commercially important, are included.

The common metals, Aluminium, Calcium, Copper, Iron, Lead, Magnesium, Manganese, Potassium, and Sodium; (also Phosphorus,) are found in a great number and variety of minerals. In this list, species containing less than ten per cent. of one of these metals do not appear under its heading, although they may appear under other metals. Varieties and doubtful species are not enumerated under the common metals.

Under the less commonly occurring metals are given all minerals containing five per cent.; under the rare or precious metals, a fraction of one per cent.

Minerals containing but one basic element are printed in *italics*. They are given first position following the sub-headings, and are arranged in order of the per cent. of metal they carry. Here are included Sulphantimonides, etc.; Niobates, Tantalates; Phosphates, Arsenates, etc., etc., in which Antimony, etc., are acidic. Under the heavy type headings of these elements will also be found again those minerals into which they enter.

Under these acidic sub-headings, *e. g.*, "Arsenates of Metals," minerals having but the one acid are printed in *italics*.

Minerals containing more than one basic element (or under acidic headings more than one acid), are printed in ordinary brevier, following the simpler compounds in italics, and are arranged in order of the per cent. of metal (or acid) contained. The names of complex compounds are repeated under the headings of the various elements contained.

Aluminium (Al) 27.

Minerals containing less than 10% pure Aluminium are omitted.

Arsenate. Durangite, Liskeardite.
Borate. *Jeremejevite*, Rhodizite.
Carbonate. Dawsonite.
Double Salts. *Topaz*, Svanbergite, Amblygonite, Sodalite, Lepidolite, Ardennite, Zinnwaldite, Cirrolite, Hamlinite.
Fluoride. *Fluellite*, Ralstonite, Prosopite, Chiolite, Gearksutite, Thomsenolite, Cryolite, Pachnolite.
Oxide. *Corundum, Diaspore, Bauxite, Gibbsite*, Chrysoberyl, Spinel, Gahnite, Zincaluminite, Tavistockite, Hydrotalcite.
Phosphate. *Turquois, Sphærite, Peganite, Fischerite, Wardite, Evansite, Wavellite, Variscite, Callainite, Zepharovichite*, Goyazite, Lazulite, Plumbogummite, Eosphorite, Kehoeite, Childrenite.
Silicate. *Dumortierite, Andalusite, Sillimanite, Zunyite, Cyanite, Schrotterite, Collyrite, Allophane, Kaolinite, Halloysite, Newtonite, Pyrophyllite, Cimolite, Montmorillonite*, Sapphirine, Margarite, Staurolite, Kornerupine, Xanthophyllite, Rumpfite, Seybertite, Paragonite. Eucryptite, Zoisite, Muscovite, Anorthite, Meionite, Euclase, Tourmaline, Ottrelite, Hydronephelite, Nephelite, Iolite, Kaliophilite, Thomsonite, Carpholite, Labradorite, Microsommite, Gismondite, Wernerite, Cancrinite, Hauynite, Andesine, Spodumene, Noselite, Lazurite, Epidote, Natrolite, Lepidolite, Corundophylite, Gehlenite, Scolecite, Mesolite, Jadeite, Prehnite, Oligoclase, Leucite, Sarcolite, Analcite, Mizzonite, Hyalophane, Laumontite, Levynite, Daphnite, Anorthoclase, Garnet, Aphrosiderite, Prochlorite, Edingtonite, Gmelinite, Lawsonite, Chabazite, Phillipsite, Albite, Partschinite, Marialite, Orthoclase, Microcline, Beryl, Offrétite, Wellsite, Bliabergite, Caswellite, Hydrobucholzite.
Sulphate. *Felsobanyite, Alumian, Paraluminite, Aluminite, Alunogen*, Fuggerite, Alunite.

Antimony (Sb) 120.

Arsenide. *Allemontite*, Antimonial Arsenic.
Double Salts. *Kermesite*, Kylindrite.
Antimonates of Metals. *Romeite, Atopite, Bindheimite, Monimolite, Magnetostibian*, Manganostibiite, Lewisite, Nadorite, Melanostibian, Ochlorite, Långbanite.
Antimonides of Metals. *Breithauptite, Horsfordite, Dyscrasite*, Willyamite, Ullmannite, Corynite, Wolfachite.
Antimonites of Metals. Mauzeliite, Falkenhaynite.
Native. *Pure Antimony.*
Oxide. *Senarmontite, Valentinite, Cervantite, Stibiconite*, Chondrostibian, Basiliite.
Sulphide. *Stibnite*, Guejarite, Berthierite, Livingstonite, Chalcostibite, Zinkenite, Miargyrite, Plagionite, Warrenite, Stylotypite, Jamesonite, Brongniardite, Semseyite, Andorite, Famatinite, Diaphorite, Freieslebenite, Bournonite, Tetrahedrite, Boulangerite, Epiboulangerite, Pyrostilpnite, Pyrargyrite, Meneghinite, Geocronite, Stephanite, Kilbrickenite, Polybasite, Kobellite, Polyargyrite.

Arsenic (As) 74.9.

Arsenates of Metals. *Berzeliite, Haidingerite, Pharmacolite, Brandtite, Roselite, Scorodite, Carminite, Wapplerite, Caryinite, Forbesite, Trichalcite, Svabite, Cabrerite, Symplesite, Annabergite, Sjögrufite, Chenevixite, Kottigite, Mixite, Uranospinite. Zeunerite, Trögerite, Atelestite, Walpurgite, Trippkeite*, Durangite, Picropharmacolite, Arseniopleite, Conichalcite, Mazapilite, Leucochalcite, Sarkinite, Pharmacosiderite, Olivenite, Adamite, Arseniosiderite, Adelite, Brandtite, Erinite, Lindackerite, Tilasite, Cornwallite, Euchroite, Chondrarsenite, Bayldonite, Lossenite, Hemafibrite, Flinkite, Pitticite, Clinocalcite, Liroconite, Tyrolite, Allactite, Synadelphite, Liskeardite, Hematolite, Mimetite, Chalcophyllite, Rhagite, Ecdemite, Veszelyite, Rhodarsenian.
Arsenides of Metals. *Skutterudite, Safflorite, Chloanthite, Rammelsbergite, Smaltite, Löllingite, Allemontite, Niccolite, Sperrylite, Domeykite, Algodonite, Whitneyite*, Cobaltite, Arsenopyrite, Glaucodot, Gersdorffite, Lorandite, Corynite, Wolfachite, Alloclasite, Rittingerite.
Native. *Pure Arsenic, Arsenolamprite.*
Oxide. *Arsenolite, Claudetite.*
Sulphide. *Realgar, Orpiment*, Binnite, Sartorite, Dufrenoysite, Enargite, Tennantite, Proustite, Guitermanite, Xanthoconite, Jordanite, Epigenite.

Barium (Ba) 137.

Carbonate. *Witherite*, Bromlite, Barytocalcite.
Double Salt. Cappelenite.
Nitrate. *Nitrobarite.*
Phosphate. Uranocircite.
Silicate. Edingtonite, Harmotome, Hyalotekite, Wellsite, Hyalophane, Brewsterite.
Sulphate. *Barite.*

Beryllium (Be or Gl) 9.1.

Aluminate. *Chrysoberyl.*
Double Salt. *Hambergite.*
Phosphate. Beryllonite, Herderite, Hamlinite.
Silicate. *Phenacite, Bertrandite,* Euclase, Trimerite, Beryl, Helvite, Danalite, Epididymite, Leucophanite, Gadolinite.

Bismuth (Bi) 207.5.

Alloys. Bismuth-Gold, Alloclasite, Chilenite, Bismuth-Silver.
Arsenate. *Atelestite, Rhagite,* Walpurgite, Mixite.
Carbonate. *Bismutosphærite, Bismutite.*
Double Salts. *Daubréeite,* Tapalpite.
Native. *Pure Bismuth.*
Oxide. *Bismite,* Montanite.
Selenide. *Guanajuatite.*
Silicate. *Eulytite, Agricolite.*
Sulphide. *Bismuthinite,* Cuprobismutite, Chiviatite, Emplectite, Rezbanyite, Galenobismutite, Matildite, Klaprotholite, Schirmerite, Cosalite, Schapbachite, Wittichenite, Aikinite, Grünauite, Kobellite, Beegerite, Lillianite.
Telluride. *Tetradymite,* Joseite, Wehrlite.
Uranate. *Uranosphaerite.*
Vanadate. *Pucherite.*

Boron (B) 10.9.

Borates of Metals. *Larderellite, Hydroboracite, Heintzite, Bechilite, Colemanite, Lagonite, Primoite, Ulexite, Jeremejevite, Hambergite, Szaibelyite, Borax, Sussexite, Rhodizite,* Boracite, Howlite, Warwickite, Nordenskioldine, Homilite, Cappelenite, Pinakiolite, Tourmaline, Axinite, Sulfoborite.
Oxide. *Sassolite.*
Silicate. Danburite, Datolite.

Cadmium (Cd) 111.7.

Sulphide. *Greenockite,* sometimes Sphalerite and Smithsonite.

Cæsium (Cs) 58.7.

Borate. Rhodizite.
Silicate. Pollucite.

Calcium (Ca) 39.9.

Minerals containing less than 10% pure Calcium are omitted.

Antimonate. Atopite, Romeite.
Arsenate. *Haidingerite, Pharmacolite, Svabite, Conichalcite, Wapplerite,* Roselite, Picropharmacolite, Adelite, Brandtite, Berzeliite, Mazapilite, Carvinite.
Borate. *Colemanite, Bechilite,* Nordenskioldine, Ulexite.
Carbonate. *Calcite, Aragonite, Hydrocalcite,* Dolomite, Pirssonite, Cuprocalcite, Ankerite, Bromlite, Barytocalcite.
Chloride. *Hydrophyllite.*
Double Salts. *Cuspidine, Apatite, Spodiosite, Homilite, Howlite, Titanite, Guarinite, Thaumasite, Mauzeliite,* Dahllite, Herderite, Dysanalyte, Nocerite, Hiortdahlite, Rhodarsenian, Schorlomite, Meliphanite, Tilasite, Leucophanite, Wöhlerite, Keilhauite, Axinite, Cenosite, Dietzeite, Pyrochlore, Rinkite.
Fluoride. *Fluorite,* Gearksutite, Thomsenolite, Pachnolite, Prosopite.
Iodate. *Lautarite.*
Molybdate. *Powellite.*
Niobate. Koppite.
Nitrate. *Nitrocalcite.*
Phosphate. *Monetite, Collophanite, Isoclasite, Martinite, Metabrushite, Brushite,* Tavistockite, Fairfieldite, Messelite, Cirrolite, Goyazite, Calcioferrite.
Silicate. *Wollastonite, Gyrolite, Okenite,* Gehlenite, Grossularite, Monticellite, Vesuvianite, Datolite, Pectolite, Harstigite, Sarcolite, Uvarovite, Melilite, Andradite, Homilite, Schorlomite, Prehnite, Meionite, Zoisite, Apophyllite, Epidote, Pyroxene, Danburite, Piedmontite, Babingtonite, Anorthite, Laubanite, Gismondite, Scolecite, Margarite, Lawsonite, Astochite, Caswellite.
Sulphate. *Anhydrite, Gypsum,* Ettringite, Glauberite, Polyhalite, Syngenite, Wattevillite, Fuggerite.
Sulphide. *Oldhamite.*
Tantalate. Microlite.
Titanate. *Perovskite.*
Tungstate. *Scheelite.*
Vanadate. *Calciovolborthite.*

Carbon (C) 12.

Native. *Diamond, Graphite.* Coal and other Hydrocarbons.
Carbonates of Metals. About forty mineral species, enumerated under the sub-headings, "Carbonates," following metal-headings.

Cerium (Ce) 141.

Double Salts. Fluocerite, Parisite, Bastnäsite, Melanocerite, Tritomite, Caryocerite, Æschynite, Tscheffkinite, Rinkite, Fergusonite, Polymignite, Samarskite.
Fluoride. Tysonite, Yttrocerite.
Niobate. Pyrochlore.
Phosphate. Churchite, Monazite.
Silicate. Cerite, Mosandrite, Johnstrupite, Allanite.

Chromium (Cr) 52.5.

Chromates of Metals. *Crocoite, Phœnicochroite,* Dietzeite, Vauquelinite.
Oxide. Chromite.
Silicate. Uvarovite.
Sulphide. Daubreelite.

Cobalt (Co) 58.7.

Arsenate. *Erythrite*, Roselite, Forbesite.
Arsenide. *Smaltite, Skutterudite, Safflorite*, Sychnodymite, Nickel-skutterudite.
Carbonate. *Sphærocobaltite, Remingtonite.*
Double Salts. *Cobaltite*, Glaucodot, Alloclasite, Willyamite.
Oxide. Asbolite, Heterogenite, Heubachite.
Sulphate. *Bieberite.*
Sulphide. *Linnæite*, Carrollite.

Copper (Cu) 63.2.

Minerals containing less than 10% pure Copper are omitted.

Antimonide. *Horsfordite.*
Arsenide. *Whitneyite, Algodonite, Domeykite.*
Arsenate. *Clinoclasite, Erinite, Cornwallite, Olivenite, Chalcophyllite, Tyrolite, Euchroite, Trichalcite, Trippkeite*, Leucochalcite, Mixite, Liroconite, Conichalcite, Chenevixite.
Carbonate. *Malachite, Azurite*, Cuprocalcite, Aurichalcite.
Chloride. *Nantokite, Atacamite.*
Double Salts. *Connellite, Tennantite, Tetrahedrite, Enargite, Melanothallite, Famatinite, Footeite, Wittichenite, Antlerite, Falkenhaynite, Kamarezite, Binnite, Chalcostibite, Klaprotholite, Emplectite, Guejarite, Cuprobismutite*, Spangolite, Epigenite, Boléite, Veszelyite, Stylotypite, Lindackerite, Rivotite, Percylite, Bournonite, Aikinite, Atacamite.
Iodide. Cuproiodargyrite.
Native. *Pure Copper.*
Nitrate. *Gerhardtite.*
Oxide. *Pharmelaconite, Melaconite, Cuprite, Tenorite*, Crednerite, Cumengéite.
Phosphate. *Pseudomalachite, Dihydrite, Libethenite, Tagilite*, Torbernite.
Selenite. *Chalcomenite.*
Selenide. *Umangite, Berzelianite*, Crookesite, Eucairite, Zorgite.
Silicate. *Dioptase, Chrysocolla.*
Sulphate. *Brochantite, Langite, Dolerophanite, Arnimite, Hydrocyanite, Herrengrundite, Chalcanthite*, Cyanotrichite, Salvadorite, Krōhnkite, Linarite, Cyanochroite, Serpierite.
Sulphide. *Chalcocite, Harrisite, Covellite*, Tennantite, Bornite, Chalcopyrite, Sychnodymite, Stromeyerite, Stannite, Cubanite, Carrolite.
Tungstate. *Cuprotungstite.*
Vanadate. Calciovolborthite, Volborthite, Psittacinite, Mottrammite.

Didymium (Di) 142.

Borate. Caryocerite.
Double Salts. Bastnäsite, Fluocerite, Melanocerite, Tritomite, Æschynite, Polymignite, Weibyeïte, Erdmannite, Wasite, Samarskite.
Fluoride. Tysonite, Yttrocerite.
Phosphate. Rhabdophanite, Monazite.
Silicate. Steenstrupine.

Erbium (Er) 166.

Double Salts. Fluocerite, Fergusonite, Euxenite, Polycrase, Yttrotantalite, Cyrtolite, Nohlite.
Fluoride. Yttrocerite.
Niobate. Sipylite.
Phosphate. Rhabdophanite, Scovillite.
Silicate. Cenosite, Eucrasite.

Germanium (Ge) 73.3.

Sulphide. Argyrodite, Canfieldite.

Gold (Au) 196.7.

Alloys. Palladium-Gold, Bismuth-Gold, Electrum, Amalgam, Küstelite.
Double Salt. Nagyagite.
Native. Gold, generally alloyed.
Telluride. Calaverite, Krennerite, Sylvanite, Müllérine, Petzite.

Iridium (Ir) 192.5.

Alloy. Iridosmine.
Native. Iridium, alloyed with other metals.

Iron (Fe) 55.9.

Minerals containing less than 10% pure Iron are omitted.

Aluminate. *Hercynite.*
Antimonate. Magnetostibian, Långbanite, Melanostibian.
Arsenate. *Pharmacosiderite, Symplesite, Scorodite*, Arseniosiderite, Carminite, Mazapilite, Chenevixite.
Arsenide. *Löllingite, Leucopyrite.*
Borate. *Lagonite.*
Carbonate. *Siderite*, Mesitite, Ankerite.
Chloride. *Lawrencite, Molysite*, Kremersite, Douglasite, Erythrosiderite.
Chromate. *Chromite.*
Double Salts. *Pitticite, Diadochite, Arsenopyrite, Tapiolite*, Ænigmatite, Beudantite, Lossenite, Pyrosmalite, Danalite, Triplite, Schorlomite, Homilite, Partschinite, Glaucodot.
Native. Terrestrial Iron, Meteoric Iron, (always containing nickel and other elements).
Niobate. *Columbite.*
Oxide. *Hematite, Martite, Magnetite, Turgite, Göthite, Limonite, Xanthosiderite*, Magnesioferrite, Plumboferrite, Manganoferrite, Franklinite, Jacobsite, Ilmenite, Ludwigite, Pyroaurite, Chondrostibian.
Phosphate. *Dufrenite, Ludlamite, Beraunite, Vivianite, Cacoxenite, Phosphosid-*

erite, Strengite, Borickite, Chalcosiderite, Triphylite, Koninckite, Childrenite, Barrandite, Calcioferrite, Triploidite, Messelite, Dickinsonite, Lithiophilite.

Silicate. *Cronstedtite, Fayalite, Hoeferite, Hisingerite, Chloropal,* Ilvaite, Thuringite, Aphrosiderite, Almandite, Crocidolite, Riebeckite, Arfvedsonite, Stilpnomelane, Daphnite, Knebelite, Rœpperite, Acmite, Lepidomelane, Strigonite, Andradite, Chrysolite, Prochlorite, Diabantite, Astrophyllite, Chloritoid, Melanotekite, Babingtonite, Delessite, Caledonite, Biotite, Glauconite, Neotocite, Ottrelite, Epidote, Allanite, Staurolite, Piedmontite, Anthophyllite, Diopside, Hypersthene, Crossite, Ransatite, Bliabergite, Caswellite.

Sulphate. *Glockerite, Utahite, Carphosiderite, Raimondite, Amarantite, Fibroferrite, Castanite, Copiapite, Melanterite, Coquimbite, Quenstedtite, Römerite, Ihlëite,* Cyprusite, Jarosite, Voltaite, Metavoltine, Quentenite, Sideronatrite, Knoxvillite, Botryogen, Ferronatrite.

Sulphide. *Troilite, Pyrrhotite, Pyrite, Marcasite,* Pentlandite, Cubanite, Folgerite, Sternbergite, Chalcopyrite, Blueite, Daubreelite, Bornite, Epigenite, Berthierite, Stannite.

Tantalate. *Skogbölite,* Tantalite.

Tellurite. *Durdenite, Emmonsite, Ferrotellurite.*

Tungstate. *Reinite,* Wolframite.

Lanthanum (La) 138.

Carbonate. *Lanthanite.*

Double Salts. Kischtimite, Bastnäsite, Fluocerite, Tritomite, Caryocerite, Melanocerite, Weibyeite, Erdmannite, Polymignite, Æschynite, Samarskite.

Fluoride. Tysonite.

Phosphate. Rhabdophanite, Monazite, Kårarfveite, Scovillite.

Silicate. Bodenite, Steenstrupine, Wasite, Muromontite.

Lead (Pb) 206.4.

Minerals containing less than 10% pure Lead are omitted.

Antimonate. *Bindheimite,* Monimolite.

Arsenate. Bayldonite, Carminite.

Carbonate. *Hydrocerrussite, Cerussite.*

Chloride. *Laurionite, Cotunnite,* Cumengéite.

Chromate. *Phœnicochroite, Crocoite.*

Double Salts. *Mendipite, Penfieldite, Matlockite, Leadhillite, Ecdemite, Phosgenite, Pyromorphite, Vanadinite, Ochrolite, Mimetite, Geocronite, Endlichite, Schwartzembergite, Nadorite, Daviesite, Fiedlerite,* Nagyagite, Boléite, Vauquelinite, Lossenite, Percylite, Caracolite, Plumbogummite, Beudantite.

Molybdate. *Wulfenite.*

Native. *Pure Lead.*

Oxide. *Massicot, Minium, Plattnerite,* Plumboferrite.

Selenide. *Clausthalite,* Lehrbachite, Zorgite.

Silicate. *Barysilite,* Ganomalite, Kentrolite, Melanotekite, Hyalotekite.

Sulphate. *Lanarkite, Anglesite,* Caledonite, Linarite, Lossenite.

Sulphide. *Galenite,* Jordanite, Kilbrickenite, Guitermanite, Meneghinite, Beegerite, Boulangerite, Dufrenoysite, Epiboulangerite, Semseyite, Jamesonite, Sartorite, Lillianite, Bournonite, Cosalite, Plagionite, Kobellite, Warrenite, Zinkenite, Diaphorite, Freieslebenite, Aikinite, Galenobismutite, Brongniardite, Schapbachite, Rezbanyite, Chiviatite, Schirmerite, Andorite.

Telluride. *Altaite.*

Tungstate. *Stolzite.*

Uranate. Uraninite.

Vanadate. Brackebuschite, Descloizite, Psittacinite.

Lithium (Li) 7.

Double Salts. Amblygonite, Lepidolite, Zinnwaldite.

Phosphate. Lithiophilite, Triphylite.

Silicate. Eucryptite, Spodumene, Petalite.

Magnesium (Mg) 24.

Minerals containing less than 10% pure Magnesium are omitted.

Arsenate. *Hœrnesite,* Berzeliite, Cabrerite, Roselite, Caryinite, Picropharmacolite, Adelite.

Borate. *Szaibelyite, Ascharite, Pinnoite,* Ludgwigite, Sussexite, Heintzite.

Carbonate. *Magnesite, Hydromagnesite, Nesquehonite, Lansfordite,* Mesitite, Dolomite, Northupite.

Chloride. *Chloromagnesite, Bischofite,* Carnallite, Tachhydrite.

Double Salts. *Wagnerite, Sulfoborite, Lüneburgite,* Humite, Chondrodite, Clinohumite, Warwickite, Nocerite, Boracite, Pinakiolite, Phlogopite.

Fluoride. *Sellaite.*

Molybdate. *Belonesite.*

Nitrate. *Nitromagnesite.*

Oxide. *Periclase, Brucite,* Hydrotalcite, Pyroaurite, Spinel, Magnesioferrite.

Phosphate. *Bobierrite. Newberyite,* Hannayite, Struvite, Hautefeullite.

Silicate. *Forsterite, Serpentine, Enstatite, Deweylite, Talc, Spadaite, Sepiolite,* Chrysolite, Clinochlore, Penninite, Saponite, Pholidolite, Anthophyllite, Monticellite, Hypersthene, Amphibole, Biotite,

Seybertite, Diabantite, Jeffersonite, Delessite, Corundophilite, Xanthophyllite, Sapphirine, Kornerupine, Pyrope, Prochlorite, Genthite, Pyroxene, Caswellite.
Sulphate. *Kieserite, Epsomite,* Kainite, Löweite, Blödite.
Titanate. *Geikielite.*

Manganese (Mn) 54.8.

Minerals containing less than 10% pure Manganese are omitted.

Antimonate. *Manganostibiite,* Magnetostibian, Melanostibian, Basiliite.
Arsenate. *Allactite, Flinkite, Hemafibrite, Chondrarsenite, Sarkinite,* Synadelphite, Sjögruvfite, Hematolite, Arseniopleite, Caryinite, Berzeliite, Brandtite.
Borate. Sussexite.
Carbonate. *Rhodochrosite.*
Chloride. *Scacchite.*
Double Salts. *Braunite, Friedelite,* Långbanite, Rhodarsenian, Ardennite, Triplite, Pyrosmalite.
Oxides. *Manganosite, Psilomelane, Pyrochroite, Hausmanite, Pyrolusite, Polianite, Manganite,* Chalcophanite, Wad, Manganoferrite, Crednerite, Pinakiolite, Chondrostibian, Jacobsite, Franklinite.
Phosphate. *Hureaulite,* Triploidite, Reddingite, Fillowite, Natrophilite, Lithiophilite, Dickinsonite, Eosphorite, Triphylite, Fairfieldite.
Silicate. *Tephroite, Bementite, Caryopilite,* Rhodonite, Neotocite, Ganophyllite, Inesite, Spessartite, Trimerite, Partschinite, Knebelite, Kentrolite, Carpholite, Rœpperite, Piedmontite, Astochite, Harstigite, Ransatite, Caswellite, Bhabergite.
Sulphate. *Szmikite, Mallardite,* Ilesite.
Sulphide. *Alabandite, Hauerite.*
Tungstate. *Hübnerite,* Wolframite.
Titanate. *Pyrophanite.*

Mercury (Hg) 199.8.

Alloy. Amalgam.
Antimonate. Barcenite.
Chloride. *Calomel.*
Double Salt. *Onofrite.*
Native. *Pure Mercury.*
Selenide. *Tiemannite,* Lehrbachite.
Sulphide. *Cinnabar, Metacinnabarite,* Livingstonite.
Tellurate. *Magnolite.*
Telluride. *Coloradoite.*

Molybdenum (Mo) 96.

Molybdates of Metals. *Belonesite, Powellite, Wulfenite.*
Oxide. *Molybdite.*
Sulphide. *Molybdenite.*

Nickel (Ni) 58.6.

Antimonide. *Breithauptite.*
Arsenate. *Annabergite,* Cabrerite, Forbesite, Lindackerite.
Arsenide. *Niccolite, Rammelsbergite, Chloanthite,* Nickel-skutterudite.
Carbonate. *Zaratite.*
Double Salts. *Gersdorffite, Wolfachite, Kallilite, Corynite, Ullmannite,* Willyamite.
Native. Nickel alloyed with iron.
Oxide. *Bunsenite.*
Silicate. *Connarite,* Genthite, Garnierite.
Sulphate. *Morenosite.*
Sulphide. *Millerite, Beyrichite, Polydymite,* Siegenite, Pentlandite, Folgerite, Blueite, Pyrrhotite.
Telluride. *Melonite.*

Niobium (Nb) 93.7.

Niobates of Metals. *Koppite, Ånnerodite, Sipylite,* Columbite, Tantalite, Pyrochlore, Samarskite, Fergusonite, Euxenite, Hatchettolite, Æschynite, Polycrase, Dysanalyte, Hielmite, Wöhlerite, Polymignite, Yttrotantalite, Tapiolite, Microlite.

Osmium (Os) 191.

Alloy. Iridosmine.
Sulphide. Laurite.
Oxide. Irite.

Palladium (Pd) 106.2.

Native. Palladium, alloyed with other metals.

Phosphorus (Ph) 31.

Minerals containing less than 10% pure Phosphorus are omitted.

Phosphates of Metals. *Beryllonite, Monetite, Martinite, Lithiophilite, Hannayite, Metabrushite, Variscite, Triphylite, Lazulite, Callainite, Brushite, Cirrolite, Natrophyllite, Collophanite, Fillowite, Barrandite, Dickinsonite, Phosphosiderite, Xenotime, Hureaulite, Fairfieldite, Messelite, Strengite, Zepharovichite, Stercorite, Wavellite, Reddingite, Kominckite, Hopeite, Calcioferrite, Triploidite, Childrenite, Eosphorite, Peganite, Isoclasite, Ludlamite, Turquois, Beraunite, Fischerite, Tavistockite, Struvite, Libethenite, Monazite, Vivianite, Churchite, Sphærite, Rhabdophanite, Tagilite, Pseudomalachite,* Amblygonite, Herderite, Apatite, Dahllite, Triplite, Spodiosite, Chalcosiderite, Dufrenite.

Platinum (Pt) 194.3.

Platinum Arsenide. *Sperrylite.*
Native. Platinum, alloyed with other metals.

Potassium (K) 39.

Minerals containing less than 10% pure Potassium are omitted.

Borate. Rhodizite, Heintzite.
Chloride. *Sylvite*, Douglasite, Erythrosiderite, Kainite, Carnallite, Kremersite.
Fluoride. Hieratite.
Nitrate. *Niter.*
Silicate. Astochite, Leucite, Orthoclase, Microcline, Lepidolite, Hyalophane.
Sulphate. *Misenite*, Taylorite, Aphthitalite, Syngenite, Picromerite, Cyanochroite, Polyhalite.

Rubidium (Rb) 85.2.

Borate. Rhodizite.

Ruthenium (Ru) 103.5.

Sulphide. *Laurite.*

Selenium (Se) 78.9.

Native. Selen-Tellurium, Selensulphur.
Selenides of Metals. *Berzelianite, Umangite, Guanajuatite, Eucairite, Zorgite, Crookesite, Clausthalite, Tiemannite, Naumannite, Lehrbachite,* Rittingerite, Aguilarite, Onofrite.
Selenite of Metals. *Chalcomenite.*

Silicon (Si) 28.

Oxides. *Quartz, Tridymite, Opal.*
Silicates of Metals. A large number of mineral species are included in this class. They are enumerated under the sub-headings "Silicates," following the different metal-headings.

Silver (Ag) 107.7.

Alloy. Chilenite, Küstelite, Electrum.
Antimonide. *Dyscrasite, Animikite.*
Arsenide. *Arsenargentite, Huntilite.*
Bromide. *Bromyrite.*
Carbonate. *Selbite.*
Chloride. *Cerargyrite,* Bordosite, Boléite, Huantajayite.
Double Salts. *Polyargyrite, Aguilarite, Polybasite, Argyrodite, Stephanite, Proustite, Xanthoconite, Embolite, Sanguinite, Pyrargyrite, Iodobromite, Pyrostilpnite, Rittingerite, Miargyrite, Matildite, Plenargyrite,* Canfieldite, Tapalpite, Brongniardite, Freieslebenite, Diaphorite, Schirmerite, Schapbachite, Stylotypite, Dürfeldtite, Polytelite.
Iodide. *Iodyrite,* Tocornalite, Cuproiodargyrite.
Native. *Pure Silver,* Cupriferous Silver.
Selenide. *Naumannite,* Eucairite, Crookesite.
Sulphide. *Argentite, Acanthite, Daleminzite,* Jalpaite, Stromeyerite, Sternbergite, Andorite, Frieseite, Castillite, Richmondite.
Telluride. *Stützite, Hessite,* Petzite, Krennerite, Sylvanite, Müllérine, Calaverite.

Sodium (Na) 23.

Minerals containing less than 10% pure Sodium are omitted.

Borate. *Borax.*
Carbonate. *Thermonatrite, Trona, Natron,* Dawsonite, Gay-Lussite, Pirssonite.
Chloride. *Halite.*
Double Salts. *Sulphohalite, Hanksite, Nitroglauberite, Darapskite,* Northupite, Noselite, Cancrinite, Hauynite, Marialite, Eudialyte, Lazurite.
Fluoride. Cryolite, Chiolite, Pachnolite, Thomsenolite.
Nitrate. *Soda Niter.*
Phosphate. Beryllonite, Natrophilite, Stercorite.
Silicate. Sodalite, Natrolite, Jadeite, Nephelite, Hydronephelite, Analcite, Albite, Acmite, Eudidymite, Astochite.
Sulphate. *Thenardite, Mirabilite,* Glauberite, Loweite, Blödite, Kröhnkite, Ferronatrite, Lecontite, Caracolite, Sideronatrite.

Strontium (Sr) 87.3.

Carbonate. *Strontianite.*
Silicate. Brewsterite.
Sulphate. *Celestite.*

Sulphur (S) 32.

Native. *Sulphur,* Selensulphur.
Sulphides, Sulphates, etc., include many minerals. They are given under the different metals.

Tantalum (Ta) 182.

Tantalates of Metals. Tapiolite, Skogbolite, Tantalite, Microlite, Hielmite, Yttrotantalite, Hatchettolite, Samarskite, Fergusonite.

Tellurium (Te) 125.

Alloys. Selen-tellurium, Tetradymite, Wehrlite, Joseïte.
Native. Tellurium, alloyed with other metals.
Oxide. *Tellurite.*
Tellurates of Metals. *Montanite.*
Tellurides of Metals. *Sylvanite, Krennerite, Calaverite, Coloradoite, Altaite, Hessite, Petzite, Stützite,* Tapalpite, Nagyagite.
Tellurites of Metals. *Emmonsite, Durdenite.*

Thallium (Tl) 203.7.

Double Salt. *Lorandite.*
Selenide. Crookesite.

Thorium (Th) 232.

Double Salts. *Auerlite*, Calciothorite, Eucrasite, Caryocerite, Tritomite, Freyalite, Polymignite, Kochelite.
Oxide. Mackintoshite.
Silicate. *Orangeite*, *Thorite*, Yttrialite, Steenstrupine.
Thorates of Metals. Thorogummite, Æschynite, Pyrochlore.
Uranate. Uraninite.

Tin (Sn) 117.4.

Borate. Nordenskiöldine.
Native. *Pure Tin.*
Oxide. *Cassiterite.*
Stannates of Metals. Kylindrite, Canfieldite, Hielmite.
Sulphide. Stannite.

Titanium (Ti) 48.

Borate. Warwickite.
Oxide. *Rutile*, *Brookite*, *Anatase*, Ilmenite, Pseudobrookite.
Silicate. Astrophyllite.
Titanates of Metals. *Geikielite*, *Pyrophanite*, *Perorskite*, Dysanalyte, Titanite, Guarinite, Polycrase, Keilhauite, Euxenite, Warwickite, Schorlomite, Æschynite, Lewisite, Neptunite, Polymignite, Pyrochlore, Ænigmatite, Mauzeliite.

Tungsten (W) 183.6.

Oxide. *Tungstite*, *Meymacite.*
Tungstates of Metals. *Scheelite*, *Wolframite*, *Reinite*, *Hübnerite*, *Cuprotungstite*, *Stolzite*, Powellite.

Uranium (U) 240.

Arsenate. Trögerite, Uranospinite, Zeunerite, Walpurgite.
Carbonate. Volgite, Uranothallite, Liebigite.
Double Salts. Hatchettolite, Samarskite, Euxenite, Polycrase.
Niobate. Ånneröd ite.
Oxide. Mackintoshite.
Phosphate. *Phosphuranylite*, Autunite, Torbernite, Uranocircite.
Silicate. Uranophane.
Sulphate. Uranopilite, Johannite.
Uranates of Metals. *Uraninite*, *Uranosphærite.*
Altered Minerals, containing Uranium. Gummite, Thorogummite, Yttrogummite.

Vanadium (V) 51.1.

Silicate. Roscoelite.
Vanadates of Metals. *Calciovolborthite*, *Pucherite*, *Brackebuschite*, *Descloizite*, *Psittacinite*, *Volborthite*, Vanadinite, Endlichite, Ardennite.

Yttrium (Y) 89.

Carbonate. *Tengerite.*
Double Salts. Cappelenite, Fergusonite, Polycrase, Euxenite, Yttrotantalite, Samarskite, Melanocerite, Ånneröd ite, Hielmite.
Fluoride. Yttrocerite.
Phosphate. *Xenotime.*
Silicates. *Rowlandite*, Yttrialite, Gadolinite, Cenosite.

Zinc (Zn) 65.1.

Arsenate. *Adamite*, *Köttigite.*
Carbonate. *Hydrozincite*, *Smithsonite*, Aurichalcite.
Double Salts. *Voltzite*, Veszelyte, Danalite.
Phosphate. Kehoeite.
Native. (doubtful.)
Oxide. *Zincite*, Gahnite, Chalcophanite, Franklinite.
Phosphate. *Hopeite.*
Silicate. *Willemite*, *Calamine*, Rœpperite.
Sulphate. *Zinkosite*, *Goslarite*, Zincaluminite.
Sulphide. *Sphalerite*, *Wurtzite.*
Vanadate. Descloizite.

Zirconium (Zr) 90.4.

Double Salts. Låvenite, Rosenbuschite.
Oxide. *Baddeleyite.*
Silicate. *Zircon.*
Zirconates of Metals. Polymignite, Hiortdahlite, Wöhlerite.

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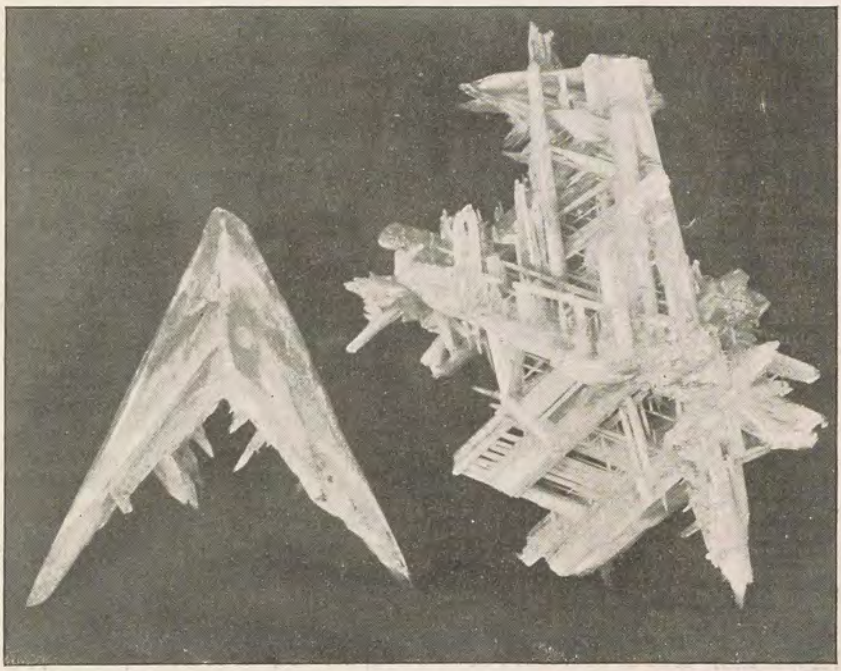
FEBRUARY 25TH, 1899

FIRST SUPPLEMENT

TO THE

COMPLETE MINERAL CATALOGUE

"New Species List" of all minerals discovered since September, 1897. Announcements of important recent accessions.



"Spear-head" and Stellate Twins of Cerussite. Secured during our special Australian collector's trip to Broken Hill, New South Wales. (Four-fifths natural size.)

Read on page 4 of the retailing of a

FAMOUS OLD COLLECTION

presenting to mineralogists an opportunity to buy historical rarities, gathered early in the century.

DR. A. E. FOOTE

WARREN M. FOOTE, Manager

MINERALS FOR SCIENTIFIC AND EDUCATIONAL PURPOSES

1317 Arch Street, Philadelphia, Pa., U. S. A.

ESTABLISHED 1876

NEW MINERALS.

Second Supplement to Dana's Classification.

The following list contains all new minerals described between September, 1897, and February, 1899. Mineralogical literature of this period was carefully searched and references made to the publications in which the original descriptions appeared.

In heavy type are given minerals which will probably be accorded the rank of distinct species, although some are doubtful.

In italics are those which will probably be classed as varieties of old species or as sub-species.

(The "*Complete Mineral Catalogue*" contains a synopsis of Dana's Classification, giving number, name, form, and composition of every known mineral, with alphabetical index and supplement; also, Metallurgical Classification and other useful information. 186 pp. 40 photo-engravings. Paper bound, 25 cents; cloth, 50 cents; calf, interleaved, $1.00.)

Baddeckite. *Am. J. Sc.*, VI, 274, '98. Variety of muscovite containing much ferric oxide.

Batavite. *Zeits. Kryst. Min.*, 28, 157, '98. Hexagonal; basic aluminium and magnesium silicate, $Si_4O_{13}2(Al(OH)_2)4MgOH$.

Beresowite. *Bull. Soc. Imp. des Naturalistes, Moscow*, 290–291, '97. Lead oxide chromate and carbonate, $2PbO.3PbCrO_4.PbCO_3$.

Bismutosmaltine. *Tsch. Min. Mitth.*, XVI, 524, '97. Cubic; cobalt arsenide and bismuthide, $Co(AsBi)_3$. Variety of Skutterudite.

Cedarite. *Jarb. Min.*, II, 212, '98. Fossil resin, resembles amber.

Celsian. *Geol. För. Förh.*, 17, 578–582, '95. Massive; barium and aluminium polysilicate, $BaAl_2Si_2O_8$.

Clinohedrite. *Am. J. Sc.*, V, 289, '98. Monoclinic; basic zinc and calcium silicate, $(ZnOH)(CaOH)SiO_3$.

Dicksbergite. *Geol. För. Förh.*, XVIII, 231, 523, '96. Simply rutile.

Erionite. *Zeits. Kryst. Min.*, 30, 176. Rhombohedral; hydrous, basic silicate and aluminate of calcium, potassium and sodium, $H_2Si_6Al_2(Ca,K_2,Na_2)O_{17}+5H_2O$.

Gersbyite. *Zeits. Kryst. Min.*, 28, 310–312, '97. Hydrous iron, manganese, calcium, magnesium and aluminium phosphate, $3(FeMnCaMg)O.P_2O_5+3(3Al_2O_3.P_2O_5)+17H_2O$.

Gonnardite. *Bull. soc. fran. min.*, 19, 426–429, '96. Orthorhombic (?); hydrous calcium, sodium, and aluminium silicate, $(CaNa_2)_2Al_2Si_3O_{15}+5\frac{1}{2}H_2O$.

Grunlingite. *Zeits. Kryst. Min.*, XXIX, 140–145, '97. Rhombohedral; bismuth sulphotelluride, Bi(STe).

Hastingsite. *Am. J. Sc.*, I, 212, '96. Monoclinic; a soda hornblende.

Heazlewoodite. *Cata. Min. of Tasmania*, 1896. Nickel and iron sulphide. Related to Pentlandite.

Kalgoorlite. *Records Geol. Surv., N. S. W.* 5, 203–204, '98. Massive; mercury, gold and silver telluride, $HgAu_2Ag_6Te_6$.

Kaliastrakanite. *Zeits. Deutsch. Geol. Ges.*, XLVIII, 632, '96. Monoclinic; hydrous magnesium and potassium sulphate, $MgSO_4.K_2SO_4+4H_2O$.

Klinozoisite. *Zeits. Kryst. Min.*, XXVI, 161, '96. Monoclinic; basic calcium and aluminium silicate, $H_2Ca_4Al_6Si_6O_{26}$.

Kosmochlor. *Zeits. Kryst. Min.*, XXVII, 592, '97. Monoclinic (?); silicate of chromium, etc.

Ktypeite. *Compt. rend.*, 126, 602, '98. Rhombohedral; calcium carbonate, $CaCO_3$.

Kubeite. *Jahrb. f. Min.*, I, 163, '98. Orthorhombic; hydrous iron and magnesium sulphate, $2(Fe_2O_3.2SO_3)+3(MgO.SO_3)+30H_2O$.(?).

Langbeinite. *Zeits. Kryst. Min.*, XXIX, 255–261, '98. Cubic; potassium and magnesium sulphate, $K_2SO_4.2MgSO_4$.

Maltesite. *Geol. För. Förh.*, XIX. Variety of Andalusite.

Manganandalusite *Geol. För. Förh.*, XVIII, 386, '96. Orthorhombic; aluminium and manganese silicate. Variety of Andalusite.

Manganotantalite. *Russ. Kais. Gesell. f. Min.*, XXIII, 181. Habit of Columbite; manganese tantalate and iron niobate, $HMn(OTaO)_2+Fe(ONbO_2)_2$.

Miersite. *Nature*, April 14, '98. Isometric; new form of silver iodide, AgI.

Mossite. *Vidensk. Skrifter, I. Math.-nat. Klasse*, 7, 1–19, '97. Tetragonal; iron niobate and tantalate, $FeNb_2O_6.FeTa_2O_6$.

Munkrudite. *Zeits. Kryst. Min.*, 28, 310–312, '97. Contains phosphoric and sulphuric acids, ferrous oxide and lime.

Planoferrite. *Zeits. Kryst. Min.*, 29, 213–216, '98. Orthorhombic; hydrated, basic ferric sulphate, $Fe_2O_3.SO_3.15H_2O$.

Prolectite. *Bull. Geol. Inst. Upsala.*, II, 99, '95. Monoclinic; basic magnesium fluosilicate, $Mg[Mg(F.OH)]_2SiO_4(?)$.

Pseudopyrophyllite. Verh. russ. min. Ges., XXXIII, 283, '95. Rhombohedral; hydrous magnesium and aluminium silicate, $3MgO.4Al_2O_3.9SiO_2.8H_2O$.

Quartzine. Ibid., XX, 52, '97. Fibrous; silica, SiO_2.

Raspite. *Ann. Mus. Wien.*, XII, 33, '97. Monoclinic; new tungstate of lead, $PbWO_4$.

Retzian. *Geol. För. Förh.*, XIX, 106, '97. Rhombohedral; basic, hydrated manganese and calcium arsenate.

Rhodolite. Am. J. Sc., V, 294, '98. Isometric; magnesium, iron and aluminium orthosilicate, $2Mg_3Al_2(SiO_4)_3.Fe_3Al_2(SiO_4)_3$. Variety of garnet.

Senaite. *Min. Mag.*, 12, 30–32, '98. Rhombohedral; iron, lead, titanium and manganese oxide, $(FePb)O.2(TiMn)O_2.(?)$.

Thalénite. *Geol. För. Förh.*, XX, 308, '98. Monoclinic. Yttrium silicate, $4SiO_2.2Y_2O_3.H_2O$.

Tripuhyite. *Min. Mag.*, 11, 302–303, '97. Ferrous antimonate, $2FeO.Sb_2O_5$.

Urbanite. Bull. Geol. Inst. Upsala, II, 77, 106, '95 Monoclinic; calcium, magnesium, sodium and iron silicate, $(CaMg)O.SiO_2 + Na_2O.Fe_2O_3.4SiO_2$. Variety of Pyroxene.

DETACHED CRYSTALS.

From among the large number of minerals received since the publication of our Crystal List, in the "Complete Mineral Catalogue," we are able to offer the following. They are isolated crystals, suitable for mounting on small cabinet stands, or for the use of the crystallographer. All are well-defined and measurable, generally averaging ¼ in. to ⅜ in. diameter. They cost from 10 cts. to 50 cts. each, those starred (*) bringing 75 cts. to $2.00 or $3.00.

ABBREVIATIONS.—c., suitable for contact goniometer; r., suitable for reflecting goniometer.

c. r. Adularia, Mono.
c. * Ænigmatite, Tric.
r. Alunite, Rhomb.
c. r. Amethyst, Rhomb.
c. r. Anatase, Tetr.
c. r. Anglesite, Orth.
c. Apatite, Hex.
c. r. " Asparagus Stone, Hex.
c. r. * Aquamarine, Hex.
c. r. * Argentite, Isom.
c. Arfvedsonite, Mono.
c. r. Axinite, brown, Tric.
r. " yellow, "
c. r. Azurite, Mono.
c. r. Barite, Orth.
c. Brandisite, Mono.
r. Calamine, Orth.
c. r. Cassiterite, Tetr.
c. Catapleiite, Hex. (?)
c. r. Cerussite, stellate twin, Orth.
c. r. Cerussite, "spear-head" twin, Orth.
c. Clinochlore. Mono.
c. r. Cobaltite, Isom.
c. r. Columbite, Orth.
c. Corundum, Rhomb.
c. " Ruby, Rhomb.
c. " Sapphire, "
c. Copper, Isom.
c. r. Crocoite, Mono.
c. r. Danburite, Orth.
c. r. * Diamond, twin, Isom.
r. * Diaphorite, Orth.
r. * Embolite, Isom.
c. r. Endlichite, Hex.
r. * Epididymite, Mono.
c. * Fluor, pink octah., Isom.
c. Fluor, modified, Isom.
c. Fowlerite, Tric.
c. r. Garnet, Isom.
r. * " octah., Isom.
c. Gehlenite. Tetr.
r. Göthite, Orth.
c. r. Harmotome, Mono.
r. * Helvite, Isom.
c. r. Herderite, Orth.
c. Idocrase, Tetr.
c. Ilmenite, Rhomb.
c. r. Ilvaite, Orth.
r. Jarosite, tabular, Rh.
c. * Jordanite, Rhomb.
r. * Liroconite, Mono.
r. * Ludlamite, Mono.
c. Manganite, Orth.
r. * Melanotekite, "
c. Mellite, Tetr.
c. Mimetite, Hex.
c. Nephelite, "
r. Neptunite, Mono.
c. Orthoclase, twin, Mono.
r. Pharmacosiderite, Isom.
c. r. Phacolite, Rhomb.
r. Phillipsite, Mono.
r. " twin, "
c. Pinite, Mono. (?)
c. r. Pistacite, Mono.
r. * Polybasite. Orth.
c. r. * Proustite, Rhomb.
c. r. * Pyrargyrite, Rhomb.
c. Pyromorphite, Hex.
c. Pyroxene, Mono.
c. r. Quartz, dodec., Rhomb.
r. Raspite (1 mm.) twin, Mono.
r. * Rhodochrosite, Rhomb.
c. Samarskite, Orth.
r. Sanadin, Mono.
c. Scapolite, Tetr.
r. Scheelite, Tetr.
r. Scorodite, Orth.
c. Smaltite, Isom.
r. Smithsonite, Rhomb.
c. r. Sphene, twin, Mono.
c. * Spinel, modif., Isom.
c. Staurolite, twin, Orth.
c. " altered, "
c. r. * Steenstrupine, Rhomb.
c. r. * Stolzite, Tetr.
c. r. Tremolite, Mono.
c. r. Wolframite, Mono.
c. r. Zoisite, Orth.

also, c. Anglesite after Cerussite. c. Azurite after Malachite. c. Chlorite after Spinel.

THE FAMOUS
TRAUTWINE COLLECTION.

We have lately purchased entire and will sell piecemeal this well-known and valuable collection, which in representation of rare minerals, has always held an acknowledged position in the first rank of great American collections.

The late Mr. John C. Trautwine was born in Philadelphia in 1810. He was one of our ablest civil engineers, his "Engineer's Pocket-book" and other works, attaining a wide circulation. Professional work carried him on long journeys through South and Central America, in one instance involving five years' residence in U. S. Colombia. This extensive foreign travel, with purchase and exchange, afforded constant opportunity for acquiring specimens. He began collecting about 1835, continuing until his death in 1883. His collection may justly be said to illustrate with great completeness the mineralogical discovery of nearly fifty years—so well, in fact, that it was visited by nearly all American mineralogists of the day. Much of this discovery is recorded only in the literature of the science, illustrative specimens being largely foreign to recent collections.

The collection comprises over 6,000 specimens, contained in 154 drawers. It includes a large number of rarities, some of which are to be found among the desiderata of the oldest and largest museums. Types and localities are shown in great variety under most common and some rare species, such as Plumbogummite, Brucite, Proustite, Pyromorphite, the Branchville (Conn.) minerals, etc., etc. Minerals of the original localities from which they take their name are frequent, the Eastern and Western Hemispheres being about equally represented. The following from a well-known scientist will be of interest:

DECEMBER 24th, 1888.

MR. WARREN M. FOOTE:

Dear Sir—I gladly comply with your request, to give my knowledge of the collection of minerals of the late Mr. John C. Trautwine. I had the pleasure and privilege of going over it many times with him, and of watching its growth, which was, during my knowledge of it, very, very slow in number of specimens, for the reason that it was his habit, in adding a better specimen, to reject the poorer, so that in his later years the collection became a most carefully selected one; it being already large and valuable when I first knew it. While it did not contain as large nor as expensive specimens as were in two other collections at the time, it was much richer in rare species, and in specimens of special scientific interest, and, according to my recollection, all but the very rarest were represented by specimens not large in size, but far above the average excellence.

When you are ready to place it on sale I shall be glad to make selections from it.

Very truly yours, T. D. R.

The specimens are all good types of their kind, and generally crystallized where so recorded in text-books. They are neat and shapely, many being choice crystallizations, and average about 3 x 2½ inches in size. Small, carefully written labels are attached, giving composition, name, and exact locality. In the work of identification, Mr. Trautwine was assisted by the late Wm. Theo. Roepper and other noted mineralogists, so that the accuracy of the labeling may be relied upon. Following is an abridged list of the older and more interesting minerals, two or more specimens of

each being on sale. If you will select from these and send also your list of other desiderata, the order will be filled and include for your approval some of the many desirable things not here enumerated, of which but single specimens are offered. Prices for the best vary between $1.00 and $5.00, with a few higher; good examples of some of the commoner kinds as low as 25 cents.

We know of no minerals so universally desired as the old historical ones, which constitute the chief feature of this unique sale. A chance is here presented to fill in those obstinate gaps in your series of species, a chance which may not occur again, since the few such collections extant are generally preserved entire in museums.

Aikinite, Beresof.
Alexandrite, Urals.
Amphibole, various.
Andalusite, Pennsylvania.
Ankerite, Styria.
Anglesite, Pa. and Sardinia.
Apatite, Saxony, Bohemia.
Apatite, Canada, Norway.
Aragonite, various.
Argentite, Harz.
Axinite, France.
Barite, Durham.
Barite, Cumberland.
Barite, Hungary.
Beryl, Urals.
Beudantite, Nassau.
Bieberite, Bieber.
Bismuth, retic., Saxony.
Bismutite, Saxony.
Bournonite, Neudorf.
Boussingaultite, Tuscany.
Bromlite, Alston.
Brucite, Pennsylvania.
Calamine, Sterling, etc.
Calcite, Rossie, N. Y.
Calcite, Andreasberg.
Calcite, Cumberland.
Calcite, Cornwall.
Calcite, Lake Superior.
Calcite, Derbyshire.
Calcite, Fontainebleau.
Calcite, Scotland.
Campylite England.
Cassiterite, Bohemia.
Cerargyrite, Chili.
Cerussite, Mies and N. C.
Chalcocite, England.
Chalcocite, Connecticut.
Chalcopyrite, Ellenville.
Chalcopyrite, Cornwall.
Chessylite, Chessy.
Chrysoberyl, Haddam.
Cinnabar, Austria.
Copper, Siberia.
Corundum, Macon Co., North Carolina.
Corundum, Sparta, N. J.
Corundum, Ruby, Clay Co.
Cotunnite, Vesuvius.
Crocoite, Beresof.
Cryolite, Ivigtuk.
Cuprite, England.
Cuprite after Mal., Chessy.
Cuproscheelite, California.
Datolite, Michigan.
Diamond, South Africa.
Diaspore, Pennsylvania.
Dickinsonite, Branchville.
Eosphorite, Branchville.
Epidote, Tyrol.
Eulytite, Saxony.
Fluorite, Cumberland.
Fluorite, Cornwall.
Fluorite, Harz.
Friedelite, France.
Galena, various.
Garnet, Pennsylvania.
Hauerite, Kalinka.
Hematite, various.
Hessite, Altai.
Hitchcockite, Georgia.
Humboldtine, Kolosoruk.
Hydroapatite, France.
Hydrocarbons, various.
Idocrase, Wilui.
Jordanite, Switzerland.
Kermesite, Canada.
Kerolite, Delaware.
Larderellite, Larderello.
Laurite, Oregon.
Malachite, various.
Manganite, Ilfeld.
Matlockite, Matlock,
Mendozite, Island of Milo.
Metacinnabarite, Reddington Mine, California.
Meymacite, France.
Moronolite, New York.
Nagyagite, Nagyag.
Neotocite, Sweden.
Octahedrite, Binnen.
Olivenite, Cornwall.
Opal, Honduras.
Peganite, Saxony.
Penninite, purple, Pa.
Pericline, Tyrol.
Plumbogummite, Brittany and Georgia.
Polybasite, Freiberg.
Prehnite, Edinburgh.
Proustite, Chili and Harz.
Pyrargyrite, Harz.
Pyrite, Roxbury, Conn.
Pyrite, Elba, etc.
Pyrolusite, Siegen.
Pyromorphite, Ems.
Pyromorphite, England.
Pyromorphite, Penna.
Pyrosmalite, Nordmark.
Pyroxene, various.
Quartz, various.
Rhodochrosite, Nagyag.
Scapolite, Diana, N. Y.
Scheelite, Bohemia.
Scolecite, Poonah.
Siderite, various.
Smithsonite, England, etc.
Sphalerite, Penna., etc.
Sphene, Tyrol.
Spinel, Orange County.
Star-Calcite, Rossie, N. Y.
Stilbite, Poonah.
Sylvanite, Offenbanya.
Taylorite, Guanape.
Tellurium, Colorado.
Tetrahedrite, England.
Tetrahedrite, Hungary.
Topaz, Urals.
Torbernite, Cornwall.
Tourmaline, Elba and N. Y.
Triploidite, Branchville.
Uranotil, Schneeberg.
Vanadinite, globular, Leadhills.
Vivianite, Cornwall.
Wavellite, Devonshire.
Whitneyite, Michigan.
Wiluite, Wilui.
Woodwardite, Cornwall.
Wulfenite, Carinthia.
Zircon, Urals.

RECENT ACCESSIONS.

In the following announcement we have endeavored to note briefly the more important new arrivals which are still on sale. They were acquired mainly through the purchase of old collections, by our own collector visiting localities, or from correspondents collecting at localities under special order from us. Where but a few of a kind were obtained, they are generally unnoticed, unless of unusual value, because of the need of keeping the list within reasonable limits. During the past year over six hundred different species and as many more varieties have been obtained in typical specimens, the Trautwine Collection alone requiring fifty to seventy-five pages to properly describe its better specimens. Moreover, a list, however exact, is a poor guide in purchasing, as minerals must be seen to be appreciated.

So we recommend all desiring to secure specimens sold before announcements can be published, to follow the habit of many of our customers, who place with us a standing order for minerals to be sent them for inspection. Specimens are shipped at our expense and risk, the customer being under no obligation to purchase, and bearing no expense other than the return of rejected specimens. Desiderata lists filed with us are carefully consulted, and the gaps they represent often filled. This "approval" system is gaining in favor, and through our efforts toward pleasing individual taste, is being rapidly extended. General instructions as to average size, price, and advice as to character of specimens desired, aid us in choosing the right specimens for inspection.

THE EDUCATIONAL DEPARTMENT is growing rapidly. Systematic collections, chemical and crystallographic material, are furnished better, cheaper, and more promptly than ever, owing to rapid increase of stock and better facilities for collecting and distributing. As an indication, within six months over six hundred drawers and two hundred stock-boxes have been purchased. These increased accommodations were necessitated by the growing stock and the adoption of plans for a perfected system of arrangement, whereby the prompt filling of large orders is assured. The notable increase in the volume and extent of our trade during 1898 has permitted of many large reductions in prices on both cabinet as well as educational material. Students' specimens may be had at less than the lowest, and occasional fine museum specimens at more than the highest price here quoted.

Many beautiful and rare cabinet specimens, contained in our regular stock, are described and illustrated by thirty photo-engravings on pages 5 to 36 of the "Complete Mineral Catalogue."

UNITED STATES.

New England.

Herderite, Auburn, Me. The large crystals which were found sparingly at this locality have been in great demand. Matrix specimens, $3.00 to $15.00; single crystals, 50c. to $6.00

Pollucite, Paris, Maine. A new locality for another rare species. Price recently dropped about 95 per cent. Characteristic examples of glassy frac-

ture, mixed with about 25 per cent. Spodumene, now retailing for $1.00 per pound.

Andalusite var. Chiastolite, Lancaster, Mass. Crystals detached and in matrix. Ground and varnished to show the cross. 10c. to $1.00

See the "Complete Mineral Catalogue" for illustrated description of *Chrysoberyl and Diaspore crystals.* Roxbury Pyrite, rare Branchville species, Tourmalines and many other New England finds are represented in the *Trautwine Collection.*

New Jersey.

Several weeks spent in personal collecting and purchasing at FRANKLIN FURNACE afforded some interesting discoveries now under investigation, and secured excellent specimens of both the new and old species, whose numbers make this locality one of world-wide reputation.

Clinohedrite. A. J. Sc., V., 289, '98. A new species of most interesting crystallographic character. Occurs in cavities of Axinite and other minerals, in brilliant pale amethystine, monoclinic crystals, of 1 to 3 mm. length. Exceedingly rare; no specimens could be collected although careful search was made, and the few existing local specimens purchased. $1.00 to $8.00

Native Lead. (W. M. Foote, A. J. Sc., Aug., 1898.) First authentic record of its occurrence in America. Found very sparingly in thin scales or films on Polyadelphite, Caswellite, and a Pinite-like mineral, some specimens showing native Copper. This is one more name added to the list of over one hundred minerals found in the Franklin district. The find should be represented in all collections, though the specimens cannot be recommended as beautiful. 25c. to $3.00

Roeblingite. A. J. Sc., III, 413, '97. A new and interesting hydrous calcium silicate, containing sulphur dioxide and lead. It was found sparingly in white masses of minute prismatic crystals, somewhat resembling massive Datolite. Rare. $1.00 to $8.00

Axinite. Crystals of 2 to 4 mm. in cavities of the massive mineral. The novelty of a lemon-yellow color in this species, and the clearness and lustrous quality of the crystals. render it desirable. 50c. to $3.00

(Pure massive, 75c., or with 25 per cent. of Polyadelphite, 35c. per pound.)

Rhodonite var. Fowlerite. Dull but symmetrical tabular crystals of 1 to 4 in. length. Generally in white Calcite. A number of fine large museum groups. 25c. to $10.00. Small crystals of a rich cherry-red color, neatly set in snow-white Calcite. 25c. to $3.00. (This latter type is comparatively new, coming from the "New Shaft," and is by far the prettiest quality found.)

Zincite. Masses of the true "Ruby Zinc" color; often in Calcite; also a micaceous variety. 15c. to $1.00

Willemite. Bright apple-green masses in white Calcite; with occasional patches of Zincite, this makes a striking combination. 15c. to $1.00. Also the variety Troostite, in symmetrical crystals. 25c. to $1.00

Franklinite. A large stock. Large octahedrons, some modified by dodecahedral planes, in Calcite. 25c. to $6.00

Calamine. Handsome groups of large milk-white crystals. 25c. to $5.00

Caswellite, cryst.; New habit of Datolite, Chalcophanite, DeSaulesite, Gahnite, Jeffersonite, Brown Tourmaline, etc., etc.

Thaumasite, Paterson. A large supply of this remarkable and formerly rare

mineral was secured. We now offer it in pure white masses of prismatic crystals at one-tenth the price first asked by other dealers. 50c. per pound

Pennsylvania.

Roseite, Chester Co. A good stock of typical crystallized specimens. 25c. to $1.50

Williamsite, Lancaster Co. Fine leek-green translucent masses. 10c. to 50c. Polished, 35c. to $1.50.

Aquacreptite, Chester Co. In firm cabinet-size masses. 25c.

Millerite, *Rutile*, *Chalcopyrite*, *Pyrite*, *etc.* The *Trautwine Collection* was rich in Phœnixville and other old Pennsylvania minerals.

Virginia.

Amethyst, Amherst Co. A new locality and new type. Bright, clean crystals in "capped" and "babel" forms. Though flawed and not of gem quality, their brilliant planes and sharp angles make them desirable for the cabinet. A small lot. 50c. to $4.00

Staurolite altered to a micaceous mineral, Patrick Co. New. Isolated twins. 5c. and 10c.

Sipylite, Amherst Co. A small stock of this rare erbium niobate, lately received. Pure masses, 75c. per ounce.

South Dakota.

Three most interesting species recently found at a new locality in Lawrence Co.; all in well defined crystals of somewhat new habits. The best specimens of the limited find were saved under our direction.

Jarosite. Tabular rhombohedrons, 2 to 5 mm., of different aspect from the usual cubic symmetry. The neat brown groups of bright, sharp edged crystals show the form well, and are classed as the best known representatives of the species. 35c. to $1.50

Wolframite. A new type of flat prismatic crystals, 2 to 6 mm. long, on a matrix of granular-crystalline Wolframite. 15c. to $2.00

Scheelite. In small, olive-green rosettes of translucent, tabular crystals, scattered over the Wolframite groups. Also minute octahedral crystals of adamantine lustre, colorless to dark gray, thickly investing the Wolframite crystals. 15c. to $1.50

Columbite, Etta Mine. A few tabular crystals of good size and excellent terminations in white quartz. 50c. to $3.00

(Pure crystalline masses, 75c. per pound.)

Colorado.

Rhodochrosite, near Leadville. Exquisite, translucent, pink crystals, with Pyrite. 50c. to $4.00

Sylvanite, Cripple Creek. Crystallized. $1.00 to $6.00

Bastnäsite xls., *Tysonite*, *Astrophyllite*, etc. See "Complete Mineral Catalogue" for illustrations of *Amazon-stone* and Salida *Garnet.*

New Mexico.

Endlichite, Hillsboro. All of the finest specimens found, were preserved and shipped to us under special standing order during a period of

fifteen months. The most recent, and, perhaps, finest quality discovered is in delicate tufts of slender crystals. They are of clear, golden yellow, with red terminations, suggestive of match-sticks, the resemblance failing with an occasional double termination. The groups are 1 to 3 cm., the single crystals 2 mm. thick and 15 to 20 mm. long. 10c. to $1.00

A large stock of splendid matrix specimens of red and yellow crystals of the types figured in the catalogue, are selling at one-half former prices. For the choicest groups of brilliant, perfect crystals, $1.00 to $6.00

Small groups of equal quality, and single crystals. 10c. to 75c.

(The material above offered is *selected* in a double sense; collected solely for us under complete instructions, and then from this mass of material the best picked out at our store. Over fifteen boxes of "good" Endlichite, which have been thus sorted, are stored away. "Fine" specimens are rare, and but few are left.)

Melanotekite, Hillsboro. Described from this first American locality, from material furnished by us. (Aug. A. J. Sc. 1898.) It is a rare lead-iron silicate, heretofore found only in Sweden. Masses showing drusy surfaces of orthorhombic crystals. 25c. to $1.50

(Pure massive mineral $1.00 per pound.)

Massicot, Silver City. We have lately discovered this rare mineral on some old specimens of Cerargyrite collected about 1870. Amorphous masses and coatings. $1.00 to $3.00

Sacramento Mts. Meteoric Iron. Plates XI and XII in catalogue. After the first slices were sawn off, there were required a number of larger slabs, to meet the demand. Etched with acid, the crystalline figures are shown beautifully. Two complete sections, taken from the centre of the mass, exhibit pyritiferous and carboniferous nodules, while the bold outline and deep pits (with a portion of their former contents remaining), are interesting features. These are splendid specimens, and among the largest sections known, measuring about 65 x 15 cm., and of uniform thickness.

The main mass, weighing 81 kilos, is also for sale.

Arizona.

Chrysoprase, near Phœnix. Recently discovered in seams and veins of fine, rich, greenish-blue color, in a siliceous limestone. While too thin and flawed to yield gem material, the green bands in a cream-colored matrix make handsome cabinet specimens. Rough, 10c. to 75c. Polished, 35c. to $2.00

Illustrated description of the following in catalogue: *Red Wulfenite, Diamondiferous Meteoric Iron, Chalcotrichite, Jasperized Wood, etc., etc.*

Other American Localities.

Grossularite, Riverside Co., Cal. We secured all the specimens obtainable, a lengthy trip being made to the locality for them. Groups of ¼ to 1½ in. dodecahedrons of remarkable brilliancy, sharpness, and rich color. 15c. to $2.00

Serpentine var. Verd-Antique, Harford Co., Md. We purchased a large supply at less than the cost of polishing. Handsome polished slabs, 3 to 14 in. across. 35c. to $4.00.

Diaphorite, Okanogan Co., Wash. A new locality for this rare species. Excellent prismatic crystals of orthorhombic habit, associated with Stephanite and ruby silver on drusy Quartz. $1.00 to $3 00

Emerald, Mitchell Co., N. C. An inexpensive Emerald of deep color, excellent for study. 15c. to $1.00. A few selected cabinet specimens lately acquired. $1.25 to $2.50

Geyserite, Sphene, Fluor in octahedral cleavages, polished Smithsonite, Chalcocite, Variscite and *Alaska Garnets*. The "Complete Mineral Catalogue" contains illustrated descriptions of *Opalized Wood, Rubellite, Colemanite, Lawsonite, Northupite, Thenardite, Halite*, etc. The *Trautwine Collection* largely represented American localities, including species like Carrollite, Montanite, Hitchcockite; some going, others gone.

CANADA.

Manganite, Pictou Co., Nova Scotia. The fine crystallizations recently saved for us at this locality, will be a surprise to many. In general excellence they are behind the older specimens from Ilfeld, but are of quite different habits. Handsome radiated masses show cavities and flat surfaces, covered with crystals of three forms. 1. Small, sharp prisms of the usual high lustre; 2. Wedge-shaped crystals of 1 cm. diameter, distinct and well formed; 3. Bundles or sheafs on Limonite, about 1 cm. long and similar to the "maggot ore," but with velvety surface. 15c. to $2.00

Barite, Pictou Co., N. S. Good examples of this species in varied habits; small, clear crystals scattered over lustrous black Limonite, forming neat and gemmy specimens. Tabular and prismatic crystals, blue to brown, measuring 2 to 4 cm., in attractive rosettes, and as large groups on Limonite base. 10c. to $1.00

Limonite, Pictou Co., N. S. Velvet-black, botryoidal and stalactitic surfaces. 10c. to 50c.

"Wheat-sheaf" Stilbites. Basin of Minas, N. S. Clean and dainty specimens of this imitative form, which the name well describes. Single and aggregated, 4 or 5 cm. long. 10c. to 35c.

Sodalite, Hastings Co., Ont. A Prussian blue, streaked occasionally with light azure. The solid masses are similar to those found in British Columbia some years ago. They are the cheapest and best examples of the mineral yet found and should be in every collection. Shapely cabinet pieces, showing fresh fracture, 1½ to 5 in., 15c. to $2.00; polished, 50c. to $4.00 (pure masses, per pound, 75c).

Klondike Gold. A second consignment. Nuggets and dust. $1.25 to $6.00

Pyroxene, Burgess, Quebec. Large, doubly terminated prisms. From an old collection. 75c. to $4.00

Star Mica, Hull, Quebec. A variety of Phlogopite exhibiting the beautiful phenomenon of asterism when a light is viewed through it. Irregular masses for cleaving, 15c. per pound. Selected thin sheets for schools, 10c. per doz. Extra choice cabinet pieces, some hexagons, 5c. to 25c. each.

Labradorite, Labrador. We have secured a large quantity of finest gem quality, exhibiting a fine play of color. Selected cleavages, 5c. to 25c.; polished, 25c. to $3.00.

Large Molybdenite Crystals are illustrated in our Catalogue. The *Trautwine Collection* contains numerous examples of old Canadian minerals.

AUSTRALIA.

From Our Special Collector.

We are glad to announce that our introduction in 1897 of various unique Australian minerals was but a forerunner of later and more notable finds. As soon as the necessity for having a collector in this rich field became manifest, the services of an experienced mineralogist were secured. We are thus enabled to offer collectors the best products of lengthy trips to distant and important localities. No efforts are spared either by purchase or collecting to secure the finest obtainable specimens.

New South Wales.

BROKEN HILL, CO. YANCOWINNA.

In this district, lead and silver have been steadily mined for many years, and it has ranked as one of the best paying group of mines in the world. The numerous shafts sunk have proved a veritable treasure ground for science. However, the distance from the large cities and the attitude of the operating companies have discouraged collectors, and few good specimens have been saved.

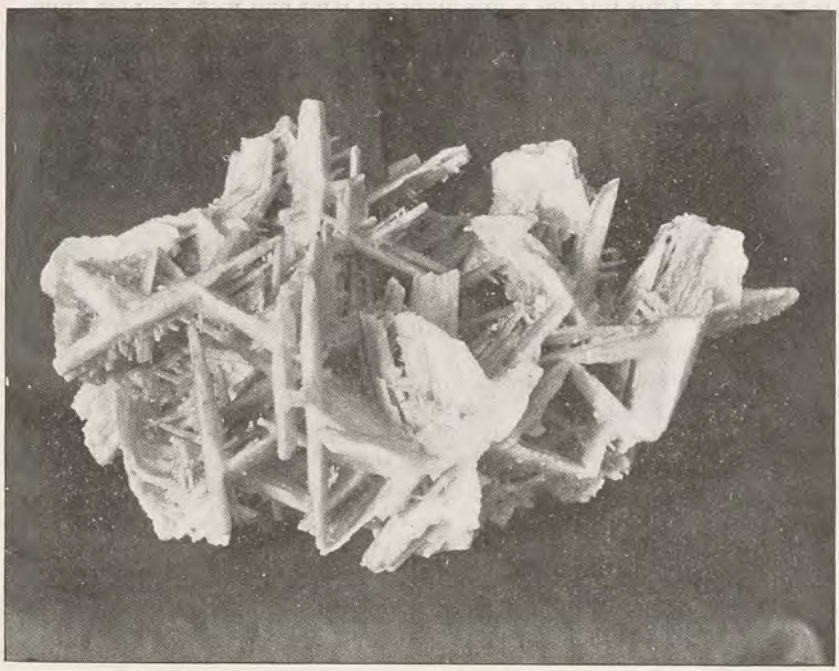
The present consignment of 1,100 pounds, resulting from the five weeks' trip of our collector, contains far superior specimens to those sold by us a year ago, as well as additional varieties. Little collecting could be done, and no purchasable specimens were left behind. We mention the most important not already sold.

Stolzite. $PbWO_4$, Tetragonal. A comparatively new but already well known find. The crystals are infinitely superior to the old German examples and are offered at about one-fifth the price. Groups of brilliant yellowish brown crystals, 1 to 2 mm. or more. Rare. 50c. to $8.00

Raspite. $PbWO_4$, Monoclinic. Ann. des K. K. Nat. Hist. Hofmus. XII, 1, 1897. A most interesting new form of lead tungstate. The crystals, which are finely developed and of clear brown color, generally measure about 1 mm., but are easily discernible by their remarkable adamantine lustre. They are long tabular in habit, doubly terminated, twinning along the longest axis being frequent. This is repeated, forming a sort of cross twin. In some crystals a pale stripe separates the deeper color of the terminations. A few pieces of Limonite showing scattered crystals. Rare. $1.00 to $5.00

Cerussite, Stellate, and "Spear-head" Twins. Never has this beautiful mineral been seen in more magnificent crystallizations than these. A fine satiny-adamantine lustre is shown alike on both the delicate gray-tinted and the snow-white crystals. The photo-engraving on the first page pictures little more than the bold outlines and the delicate inter-network of crystals, unequalled by even the passing evidences of frost. But here indeed is one of nature's permanent beauties. The crystal terminations are sometimes broken or lost sight of in the surrounding maze of crystallization; more often they are preserved in the natural inclosures, into which the points project. A variety of form is exhibited in both types, the "spear-head" being quite obtuse, or one shaft longer than the other. Some are prettily invested with light green Embolite. Selected cabinet specimens, $1.00 to $8.00. Smaller, but equally good quality, 15c. to 75c. (A pure, gray-brown crystalline Cerussite—the common ore, 25c. per pound.)

Anglesite Coating Twinned Cerussite. As suggested in the illustration, this is simply a secondary deposit of small, brilliant Anglesite crystals on the Cerussite. The various forms of the latter are well illustrated, but necessarily much of the exquisite delicacy of the network is lost,



Anglesite Coating Twinned Cerussite, secured by our special collector at Broken Hill, N. S. W.—½ Natural Size.

only the general lines of the primary crystallization remaining. The crystals average 1 to 3 mm., the larger being symmetrical and clear cut forms of the simple orthorhombic habit. The dazzling effect of this drusy coating is a striking feature. Selected cabinet specimens of museum and cabinet size, $2.00 to $12.00; smaller, 15c. to $1.50.

Golden Anglesites. Like the foregoing, but the Cerussite base less prominent, the Anglesite crystals being better defined, and often exceeding 1 cm. They are of a brilliant golden or honey-yellow tint. A few specimens of cabinet size. 50c. to $5.00

Cuprite. Dull cubo octahedrons on matrix. 25c. to $2.00

Azurite. Groups of definite and brilliant crystals of 2 to 12 mm. size; fine color, gemmy quality. 25c. to $3.00

Malachite pseudomorph after Azurite. Tabular crystals, often exceeding 1 cm., in groups. 50c to $3.00

Embolite. A large stock in three types:

1. Symmetrical cubes with one or both tetrahedra, 1 to 2 mm., scattered over a Limonite matrix; some in Quartz and others prettily associated with Cerussite or Native Silver. 50c. to $3.00

2. Sponge-like and irregular pure masses; also mixed with Quartz. 15c. to $3 00

3. Films and grains in a solid kaolin-like mineral. 15c. to 75c.

Our recent price was lower than formerly obtained, and present prices on new stock of Nos. 2 and 3 are still 50 per cent. lower, as these are simply selected pieces of the richest ore. (Pure fragments for laboratory, 75c. per oz.)

Iodyrite. In bright little crystals illustrating well the hemimorphic hexagonal character. On Wad and Limonite and occasionally, Malachite or crystallized Smithsonite; also massive pieces. Rare. $1.00 to $8.00

Native Silver. Crystallized arborescent films and isolated crystals on dark Limonite, making pretty specimens. Also with various associations. 25c. to $3.00

Strontianocalcite. Described by Genth in 1852, as a variety of Calcite containing strontium carbonate, giving a decidedly red flame before the blow-pipe. In opaque white globules having a surface consisting of terminations of acute rhombohedrons. This new find answers the description. The globules are 2 to 12 mm. diameter and neatly mounted on a stalactitic Limonite. Minute isolated rhombohedrons are sometimes present. Also in botryoidal masses of pale pink tint. 25c. to $2.00

Pyromorphite. Aggregates of rich brown hexagonal crystals of good size, at once suggesting the familiar specimens from Nassau. Smaller pale brown crystals massed in arborescent shapes; also crystals invested with a yellowish Mimetite. 15c. to $3 00

Smithsonite. Scalenohedral crystals of pale green and gray tints. Also massive botryoidal. A few of the cupriferous variety (Herrerite) in showy apple-green druses. 15c. to $1.50

Queensland.

Precious Opal. Several fine specimens of this lovely gem, from the locality affording the bulk of the best stones on the market. Pieces of the jaspery iron-stone, with broad surfaces of the gem opal, displaying flashes of red, green and blue. $5.00 to $20.00; smaller, 25c. to $3.00

A parcel of splendid cut Opals recently purchased in Australia, includes stones of the finest quality, ½ to 2 carats each. $6.00 to $8.00 per carat

Handsome large gems, 4 to 8 carats. 50c. to $2.00 per carat

Other Queensland minerals, including Stream Tin, Wood-Opal, Geyserite, etc.

Victoria.

Chabazite var. Phacolite, near Melbourne. Later specimens surpass in beauty those first received. See Plate VII in Catalogue. Showy specimens of hexagonal twins, and some more complex of spherical outline, on basalt. 25c. to $4.00

Phillipsite, near Melbourne. Some extra choice specimens among recent accessions, exhibiting the cross and multiple twins to perfection, on the dark matrix. Prices reduced one-half. 15c. to $2 00

Ferrocalcite, near Melbourne. A large consignment of this brown acicular Calcite. Groups, sometimes daintily "sprinkled" with minute globules and snowy tufts of Mesolite. 15c. to $1.50

Mesolite, near Melbourne. Large and showy specimens lately received. Dome shaped pieces of basalt coated with white capillary crystals and globules. 50c. to $1.50

Newberyite. Skipton Caves. Secured by a special trip to the locality in 1897. Described in 1879, but until our introduction of it, almost unknown. Crystallized aggregates. 15c. to $1.50

Analcite, Sphærostilbite, Gmelinite, Vivianite, Gold Quartz, etc.

South Australia.

Malachite, Burra Burra. Banded masses of fine green; a few polished. 25c. to $2 00

Atacamite, Yorkes Peninsula. Small clear green crystals in matrix. Fine quality. 50c. to $1.50

Tasmania.

Our collector spent eight weeks on the island in visiting the most promising districts, buying and collecting. The number of mines closed down proved a serious handicap, this condition prevailing among many of the properties known locally as producers of specimens. A thorough search was made for all specimens which had been saved.

Dundas District.

Crocoite. To say of this new find, that it is represented by crystallizations far superior to the old and highly-prized Siberian specimens, is almost sufficient. As the collecting of this grand mineral was the principal object of the Tasmanian journey, it is with some satisfaction that we call attention to its first general sale. The best specimens secured will substantiate the claim that it is, all things considered, among the best half-dozen crystallizations known to mineralogists. It was found about six years ago, only an occasional sample having left Tasmania, and that quite recently. The mineral occurs in aggregates or loose masses of delicate prismatic crystals, their gorgeous orange-red presenting a splendid flash of color, which even excels that of the showy Arizona Wulfenites. An attractive variation is introduced by the association of a black ferro-manganese matrix, which frequently contains isolated crystals of uncommon perfection and brilliancy. The fine color and exquisite definition of the crystals are well displayed against the dark background. Besides the prismatic crystals (some of them hollow-square prisms), tabular, sphenoidal and other habits of the monoclinic system are seen. Sulphur-yellow Massicot rarely forms a pulverulent deposit. Specimens picked from a large consignment, $1.00 to $8.00. Smaller pieces and loose crystals, 5c. to 75c. (Pure fragments of crystals, 50c. per ounce.)

Massicot. Found sparingly in solid masses and as a pulverulent coating on Anglesite. Ochre-yellow color. 50c. to $3.00

Anglesite. Groups of fine adamantine crystals in well-defined habits of good size and perfection. 25c. to $5.00

Pyromorphite. Small, bright crystals in matrix. A dark-green type exactly resembling that from Pennsylvania. 5c. to 50c.

Cerussite. Pure masses of satiny-white prismatic crystals, making handsome examples of a familiar type.
25c. to $2.00. (Crystal fragments, 50c. per lb.)

Also *Kammererite, Siderite, Bismuthinite, Chalcophanite, etc.*

ROSEBERRY DISTRICT.

Argentiferous Tetrahedrite. Yielding 600 oz. silver to the ton. Neat pieces, showing fresh fracture. 10c. to 35c. (Pure, for laboratory, 50c. per lb.)

Axinite. Occurs in a new habit of brilliant dark-brown tables, the edges modified. Pretty groups of 2 to 6 mm. crystals.
15c. to 75c. (Massive, per lb., 75c.)

Greenland.

A consignment just in contains good crystallized specimens of *Lievrite, Steenstrupine, Ænigmatite, Elpidite, Epididymite, Neptunite, etc.*

Terrestrial Iron, Disco Island. Pieces of the original mass described by Nordenskiold. ($3.20 per lb.) 25c. to $12.00

Europe.

Thalenite, Osterby, Sweden, Geol. For. Forh. XX, 308. A new and very rare mineral, containing the largest percentage of yttrium in any natural compound. We have it direct, in small, typical specimens. $1.50 to $6.00

Asparagus-stone, Norway. A pale-green variety of Apatite, occurring here in clear crystals of gem-like quality. Perfectly symmetrical prisms, surmounted by pyramid and basal plane; 5 to 15 mm. long. 15c. to 75c.

Insects in Amber, Baltic Sea. The acquisition of an extensive old collection enables us to offer a beautiful quality of polished Amber, showing interesting fossil remains. They include perfect examples of flies, spiders, mosquitoes, caterpillars, larvæ, and other curious examples of insect life, as well as occasional leaves, sticks, algæ, etc. 50c. to $4.00

Epidote, Pink octahedral Fluor, English Fluors, Barites, Olivenites, Tennantite, Boulangerite, Arsenopyrite, Argyrodite, Hessite, Bismuth, etc. Considering that it was made in America, the old *Trautwine Collection* was unusually rich in rare European minerals of the period 1835–84.

Large and showy *Sulphurs, Aragonites, Selenites, Pyrites, Hematites, Eudidymites, Paisbergites, Anglesites, Phosgenites, and Meneghinites,* were acquired during extensive personal trips in '87, '89, '90, and '92. Later consignments have replenished our stock of these and other important finds.

SUPPLEMENTARY POUND LIST.

Including Reductions in Prices.

Minerals Sold by Weight for Use in Chemical and Technical Laboratories.

The utility of the lengthy pound list published in the "Complete Mineral Catalogue" has been frequently attested. The following are items added or corrected within the past year through efforts to get material direct, in the establishment of wider connections, and in taking prompt advantage of new finds. That an enlargement of facilities for collecting and distributing, cheapens cost to the consumer, is in evidence here. Upwards of 50 minerals are now quoted

at 25 per cent. to 65 per cent. lower than formerly. But one is higher (due to advance in commercial price). Some 50 more are added.

PRICES are per pound avoirdupois, except where ounce (oz.) or gram. are mentioned. 10c. is the minimum charge. Larger quantities at lower rates. Minerals are 95 per cent. to 100 per cent. pure except where approximate percentage is noted. Printed labels show name, composition, and locality.

PROMPT DELIVERY. All of the minerals most commonly called for, and some of the rare ones, are kept in 1, 2 and 5-pound packages for shipment on the day order is received.

Complete Pound List sent Free.

	Per lb. $ cts.
Aegirite,	$0 75
Alabaster,	05
Alunite,	15
Andalusite	75
Andesite, xls., per oz., $1.25.	
Anorthite, xls. per oz., 50c.	
Argyrodite, per gram, 25c.	
Arsenopyrite,	05
Asbolite,	60
Bauxite, Georgia,	05
Blodite,	35
Boracite,	25
Bronzite,	15
Castorite, per gram, $1.00.	
Caswellite,	50
Cerite,	50
Cerussite, gray mass. N. M. or N.S. W.,	25
" white xl. fragments, Tas.,	50
Cervantite,	75
Chalcophanite,	50
Chiastolite,	1 50
Chlorastrolite, per oz., 25c.	
Chloritoid (Masonite),	15
Chlorophane	20
Chrysoprase, fine color, per oz., 25c.	
" " 15%,	50
Cleveite, per oz., 50c.	
Condurrite, per oz. 25c.	
Copalite, Zanzibar,	1 25
" (Kauri), N. Zealand,	1 00
" Manila,	35
Crocidolite, unaltered,	35
Crocoite, per oz., 50c.	
Cylindrite,	3 00
Deweylite,	50
Diadochite, per oz., 20c.	
Diamond (bort), per carat, $3.00.	
Diopside,	1 00
Embolite, N. S. W., per oz, 75c.	
Emerald, xls., per oz., 50c.	
Endlichite, xls., principally Vanadium, Arsenic, and Lead,	2 00
Endlichite, massive, mixed with Wulfenite,	35
Epsomite, per oz., 20c.	
Fassaite,	75
Fluocerite, per oz., 35c.	
Gersdorffite, 10%,	50
Gmelinite, per oz., 20c.	
Griphite,	60
Halloysite,	20
Heulandite,	1 50

	Per lb. $ cts.
Hyalite, per oz., 50c.	
Hydrous Anthophyllite,	$0 20
Hydrozincite,	1 50
Indicolite, per oz., 25c.	
Iridosmine, per gram, 50c.	
Jefferisite,	50
Knebelite,	2 00
Labradorite, Labrador, gem quality,	25
Linnæite, per oz., 35c.	
Magnetite Sand,	15
Manganite, xline,	15
Margarite,	50
Martite,	50
Melanotekite,	1 00
Melanterite,	60
Mendipite, per oz., $1.50.	
Millerite,	1 25
Molybdenite,	50
Nagyagite, per oz., $2.00.	
Newberyite, per oz., 50c.	
Northupite, per gram, 35c.	
Pandermite,	25
Parisite, per oz., 75c.	
Pectolite,	50
Peridot (Chrysolite), gem pebbles, per oz., 20c.	
Phenacite, per gram, 10c.	
Pisolite,	35
Pyrope,	25
Realgar,	1 00
Rhodonite, Mass. or N. J.,	20
Sipylite, per oz., 75c.	
Sodalite,	75
Stannite,	60
Star Mica (Phlogopite),	15
Strontianite,	05
Sylvite,	25
Tetrahedrite,	35
" Argent., 600 oz. to ton,	50
Thaumasite,	50
Thomsonite, per oz., 35c.	
Thulite,	50
Uintahite,	20
Uvarovite,	60
Variscite, 75%,	1 00
Verd-Antique (Serpentine),	15
Witherite,	05
Wolframite,	20
Xanthosiderite,	20
Zinkenite, per oz., $1.50.	
Zinnwaldite	25

MINERALS PURCHASED OR EXCHANGED.

While most of our stock is acquired through personal collecting, we also buy of collectors, mining men or others, who may be in a position to supply specimens direct from localities. Two classes of minerals are always wanted in quantity:

1. CABINET SPECIMENS of finely crystallized or rare minerals. They must show as large and perfect crystals as are obtainable. In the case of very rare compounds and such as do not crystallize, sometimes occurring as "pocket ores," massive specimens are valuable. Quality and perfection of crystals, or rarity, but seldom size or weight, determine values. No list can be furnished of this class of desiderata, as a slightly varying type from a new locality may be desired of a mineral already largely represented in our stock.

2. EDUCATIONAL SPECIMENS. As the stock of any mineral gets low, or an opportunity is presented of replacing it by something better, we usually lay in quantities varying between 200 and 2,000 pounds. They are paid for by weight when quality varies but little. Where they so occur, they are wanted crystallized. Pure massive material is wanted of many minerals used in laboratory work. Study specimens of the same mineral are useful in the matrix, as illustrating its associations. This is necessary in the case of expensive minerals, such as those holding the precious metals, where a small percentage of pure mineral in matrix is preferred to a free fragment.

SAMPLES should accompany all offers, as no quotations or contracts can be made before seeing them. They need not weigh more than one or two ounces each, but should show good crystallization where possible. Full and exact locality should be given.

PAYMENT in cash at fair wholesale prices. More liberal allowance can be made if specimens are accepted as payment.

PERFECTION OF CRYSTALLIZATION. The preservation of the original outline of crystals from scratches or bruises is imperative. Such crystals are worth two to six times more than one that has been broken or otherwise damaged. (Note shipping directions below.)

OLD COLLECTIONS purchased for cash. We buy only minerals, and not rocks, fossils or other Natural History specimens. METEORITES wanted.

Shipping Directions.

Large masses of rough ores, having little specimen value, may be sent in barrels or boxes without other packing material.

Small specimens, or such as show any crystallization, should each be wrapped with six or eight thicknesses of paper.

Delicate or finely crystallized specimens should have, first, several layers of soft tissue paper and then cotton (or excelsior in the case of stout crystals).

Very fragile specimens should be packed with tissue paper and cotton and then placed in small separate boxes. These separate parcels should be firmly packed with cotton to avoid shaking. Capillary or other delicate crystals which cannot be touched with packing, must be firmly wired or tied in boxes. If such crystals are in a cavity it may be covered with stiff pasteboard.

No Cotton next to Specimens; they need to be protected from the cotton fibres by tissue paper.

No Sawdust should be used, excelsior or shavings being preferable.

Boxes should weigh not more than 200 pounds, and be strongly made. They may be strengthened if necessary by iron bands or wires. The contents must be packed in very tightly, to avoid any possibility of settling and consequent shaking about in transit.

The trimming off of superfluous rock beyond a certain "danger line" is safest done with our large mineral trimmer. Overhanging masses of rock protect crystals better than packing.

These suggestions are not offered to those who are accustomed to shipment of scientific specimens, but to the inexperienced.

SCIENTIFIC BOOKS.

We invite attention to our immense stock of **New and Second-hand Books** in all branches of the Natural and Physical Sciences, including **Geology, Geological Survey, Mineralogy, Mining and Metallurgy, Botany, Agriculture, Zoology, Entomology, Ornithology, Icthyology, Herpetology, Invertebrata, Ethnology, Microscopy, Electricity, Chemistry, and Physics.**

Catalogues on the above subjects sent **free.** In ordering a catalogue please mention the subject in which you are interested.

☞Our prices are uniformly low, and on some classes of books we are now offering liberal discounts.

COMPLETE MINERAL CATALOGUE.

New and entirely rewritten. Contains a Systematic Classification, giving Crystallographic Form and Chemical Composition of all known Minerals. Our February, 1899, Supplement completes the list to date. A new Metallic Classification, showing the various Combinations in which the Metals occur in Nature; Alphabetical Index of all Mineral Names, with Price-lists of Cabinet Specimens, Gems, etc. 186 pages, with 40 splendid photo-engravings. Prices, postpaid: paper bound, 25 cents; cloth, 50 cents; calf, interleaved, $1.00.

MINERAL PRICE-LISTS FREE.

Illustrated Catalogue and Price-List of Minerals.

126 pp., prices and descriptions of cabinet specimens and educational collections.

Collection Catalogue.

64 pp. Lists and prices of systematic collections for teachers, students, and prospectors; minerals sold by weight; crystals; books and sundry supplies.

Probably no department of our business is more favorably and widely known than that furnishing educational material. We received the **HIGHEST AWARD AND MEDAL** given for "**Collections of Minerals**" at the Centennial, Philadelphia, 1876. Also medals or diplomas at the Exposition of St. Louis, 1875; New Orleans, 1884–86; Louisville, 1886; London, 1887; Paris, 1889.

DR. A. E. FOOTE,

WARREN M. FOOTE, Manager,

MINERALS AND BOOKS,

1317 Arch Street, Philadelphia, Pa., U. S. A.

Established 1876.